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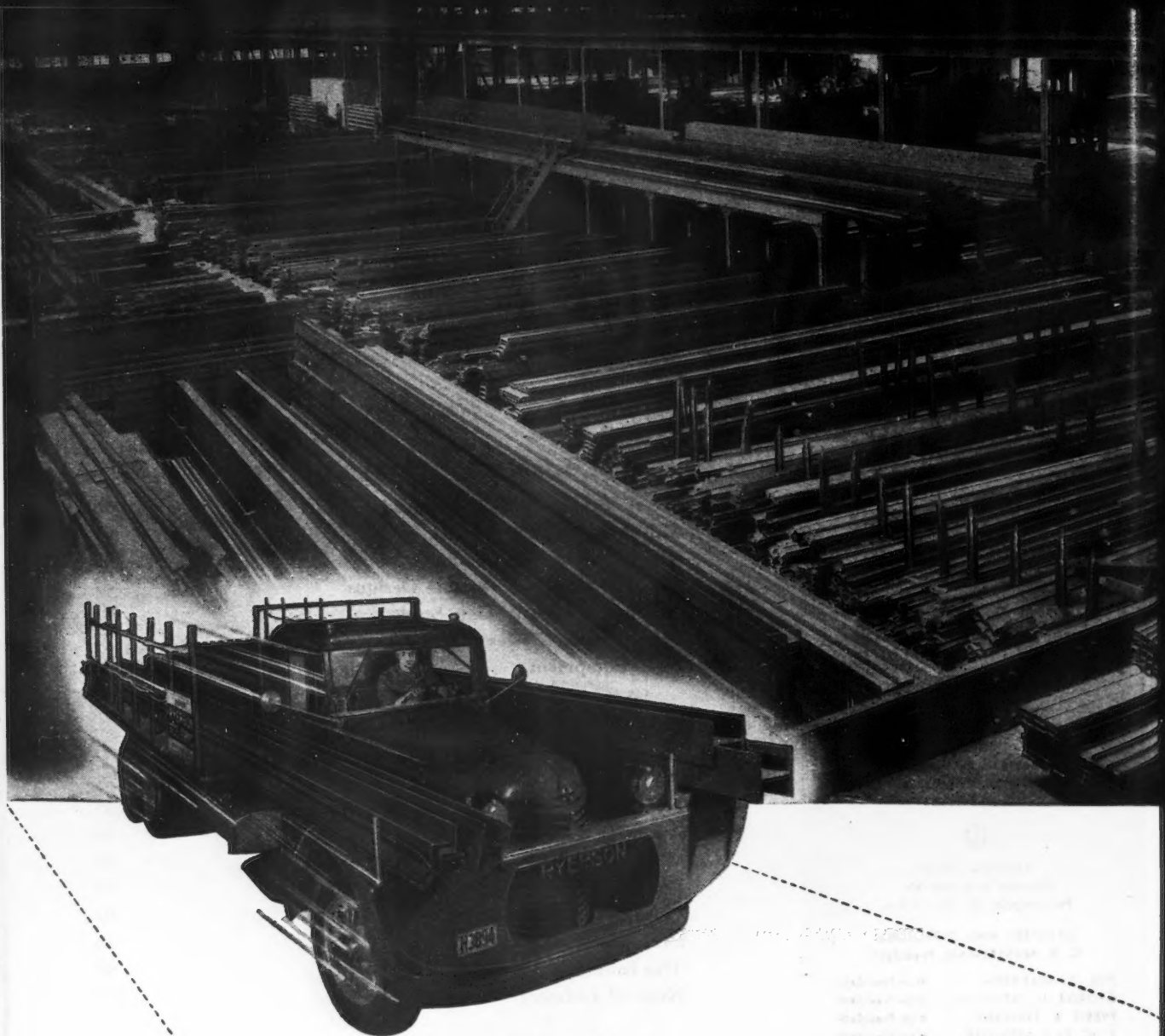
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Walking the Tight Rope

FOLLOWING an annual practice of fifty years standing, I went to the circus one night last week. It was a good show although the manpower shortage, in evidence here as elsewhere, was reflected in an unusually large proportion of women performers.

One goes to such entertainments to forget present day troubles and business. But the circus this time did not do that for me. It emphasized them. That was not the fault of the entertainment but most likely a current personal mental quirk.

The circus, on this occasion, seemed to symbolize a number of things that we are experiencing in industry. One was the black market and labor racketeering; another was the contrast between an incentive system and the lack of it in getting work done; still another was a reminder of management's present difficulty in walking the tight rope. I will take these up in order.

The house was about sold out when we got there and the only obtainable seats were in the rear of the top gallery which is as close to heaven as anyone can get in Madison Square Garden. A very polite usher examined our tickets. "You can't see much from up there," he said, "but for a buck apiece I can slip you into some good seats on the lower mezzanine." I saw this enterprising young man repeat this performance at least a dozen times that evening. Any time that he wants a recommendation for employment by Petrillo or Lewis, I will write him one.

It was a joy to watch the trained seals. They went through their act of juggling, balancing things on their noses and playing tunes on musical horns with evident gusto and enjoyment. After each act they would applaud themselves by clapping their flippers. And after each act, each would be given a fish by their trainer. The incentive system at work.

The animal act with the trained cats was a diametric opposite. Here was an example of unwilling workers being driven to their tasks under lash and prod and obviously hating their boss. They got no meat in reward but they clearly would have liked to make a meal of him.

The Wallendas, on the high wire, gave their usual hair raising performance. Two cyclists crossed the high wire with a bar extending from one's shoulder to the other's; another performer, standing on a chair, balanced on that bar both himself and a woman who was doing a handstand on his shoulders. No net beneath them and a 60 foot drop to the ground. Enough to send cold chills down your back.

But the audience respected the difficulty of the act. There was absolute quiet while it was going on, and no rocks were thrown at them. Quite a contrast, I thought to what management encounters today in walking its tight rope.

After all, however, the Wallendas have to contend with but one law, the law of gravity. And management has to contend with hundreds of laws and thousands of regulations. And there is no net to catch it if its foot slips, and plenty of rocks and brickbats fly to make things more difficult.

Funny, isn't it, what one can think of at a circus?

J. H. Van Deventer



Three operators pierce, punch and trim at each press stroke.

Container Rim Output Increased 300%

Novel die set-up and Inland Sheets increase war part production

Output of cartridge storage container rims, drawn 4 in. deep on an 8-in. diameter, has been stepped up from 400 to 1200 per day. This increase results partly from die design and die use, and partly from the extremely low breakage of Inland Hot Rolled Pickled Sheets.

In the first operation 0.125" stock is blanked and drawn full depth with $\frac{1}{2}$ " shoulder, in a double acting press. These deep drawn parts are moved to another press in which are mounted two dies, one for piercing out the bottom and the other for sizing the bottom, which is used later to close the container. The two operations are performed at each press stroke.

The rim is then taken to a third press in which are three dies, which pierce locating holes, punch out the start of keyways, and trim on the 8-in. diameter. A rim is completed in three press strokes.

Final operations consist of spot welding three lugs to the inner surface of the rim, finish piercing the keyways, and swedging the lugs to the rim for a close fit.

The increased speed of manufacture of these cartridge storage container rims is an example of how Inland quality steel is helping America win the battle of production.



Inland sheets are blanked and drawn 4-in. deep in one operation.



Each stroke of this press pierces out the bottom of a rim and sizes the bottom obtained during the previous press stroke.



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News Front

► New Army weapons, designed since the overall light metal supply situation improved last fall, include an aluminum bazooka, magnesium cased movie camera, aluminum armor vest, aluminum food carrier, as well as an aluminum "snake" mine clearing device, rocket powered.

A modification of the General Pershing tank, the T26E4 carries a high velocity 90 mm. gun. Using the tungsten-carbide core shell, the Army claims penetration of 14 in. armor at 300 yds.

► Current WPB plans will release all L and M orders as soon as possible after VE-Day. Restrictions on textiles, paper, pulp, chemicals, leather, and tires will probably have to remain.

Though the decline in munitions manufacturing will run 35 to 50 per cent, the decline in total manufacturing will total only around 10 to 15 per cent, due to the increase in output of civilian goods.

► A 2100 hp. aircraft engine weighing only 1640 lb., has been designed by the Continental Aviation and Engineering Corp., and is now in limited production. Known as the I-1430, it is a 12-cylinder 60-deg. inverted V type.

Cylinders are cast individually rather than en bloc, intended to reduce stresses at maximum loads, and to permit refinements to improve the cooling characteristics.

► The navy is developing a twin-jet airplane, using rocket propulsion similar to that of the German Me-163, as well as a twin jet craft using gas turbine powered jets.

► WMC is reducing employment ceilings in less essential industries as rapidly as possible, since hope of passing a national service act has been abandoned. Cutbacks on munitions program working at the opposite end of the manpower problem, will soon start laying off workers.

► Pre VE-Day cuts in steel for ammunition will mean a reduction of 22,000 tons in military allotments in the second quarter and about 300,000 tons in the third quarter. This means that the second quarter shell steel rate will continue.

► Automotive reconversion plans include about \$20,000,000 worth of machine tools and about \$10,000,000 or more in tooling. Some of this work has already begun to appear in Detroit tool shops, as well as an indeterminate amount of die work. Tool men figure three or four months will be needed to clean up all automotive retooling programs.

Problems of the planning departments are manpower and materials. Textiles, lead, tin, rubber, lumber and some few chemicals are of particular concern.

► Foremen will probably experience a material change in their status following their organization into a collective bargaining unit, Packard Motor Car Co. and General Motors advised.

Following foremen organization, candidates for higher management would then be selected and trained for their positions from the start not promoted from the ranks, George T. Christopher, president of Packard, said in a letter to supervisors.

► Canada anticipates a cutback of not more than 35 per cent in its munitions program at the cessation of European hostilities. For the past year Canadian plants turned out materials with a cost value of more than \$2,200,000,000.

► Fisher Body Co. has purchased a site near Hamilton, Ohio, for the construction of an auto body stamping plant, others in Cleveland, Grand Rapids, Detroit, and in Pontiac, Mich., are contemplated.

► William S. Jack, president of Jack & Heintz, Inc., will leave on or about May first for an overseas assignment. This company will make a 2-cycle engine in the plant just acquired formerly occupied by the National Carbon Co., in Cleveland.

Metallurgical Control Of Shaved Aircraft Gears

... As a sequel to the article by Charles G. Pfeffer which appeared last week on the mechanical aspects of gear shaving practice at Wright Aeronautical Corp., Mr. Liebendorfer discusses the heat treatment of the gears, with particular emphasis on carburizing practice. Since the gear teeth are not touched after hardening, it is essential that decarburization be avoided during hardening. Radically new methods have been devised to measure and control the amount of decarburization that might take place in thin surface layers.

SINCE the shaved gear is placed in service with the tooth profile untouched after heat treatment, small variables in the heat treatment have a pronounced effect upon the service life of the gear. The most troublesome of these variables to control is decarburization. Unfortunately, decarburization is the worst enemy of the shaved tooth surface. Small amounts which may not be detected by standard hardness testing methods or by microscopic investigations can mean excessive galling or "welding" of highly loaded aircraft gears. If this decarburization is not avoided the shaved gear's freedom from grinding burns and its profile accuracy are largely offset. This is not the only metallurgical problem involved in gear shaving, however. In the highly alloyed carburizing steels the soft retained austenite often encountered in the structure can detract considerably from the optimum case hardness obtainable. Depending upon the case depth and the carbon concentration gradient, this soft structure can result in two distinct types of failures. If the case depth is not too great, the soft austenite

By R. E. LIEBENDORFER
Supervisor of Heat Treat Control &
Development Methods, Materials Laboratory, Wright Aeronautical Corp.

may occur immediately at the surface and result in a galling type failure indistinguishable from that due to decarburization. If the case depth is greater and the surface carbon concentration is exceptionally high, hard alloy carbides appear at the surfaces and may prevent the galling type of failure. However, the retained austenite in this instance can cause a sharp drop in the hardness 0.005-0.010 in. below the surface. With the excessive loadings encountered in some aircraft gears this may result in pitting due to failure in sub-surface shear.

All of the heat treatment referred to up to this point consists of operations after the shaving has been completed. It is just as important, however, to have proper heat treatment for machinability purposes prior to shaving, so that the shaved surface is not left with ragged tears and gouges which will remain on the finished tooth. Controlled heat treatment in this field is much older and is not restricted merely to shaved gears. If close control is not maintained over the initial hardness and structure, cutting speeds cannot be

kept constant and where grinding is practiced, excessive time must be expended in grinding off heavy burrs from very soft gear teeth. Consequently, this becomes an expense consideration as well as an item of quality control, and as such has received considerable attention in the past.

Forgings Normalized

Control of metallurgical quality in shaved gears starts when the forged gear blank is received. Nearly all of the carburizing grade gears at Wright Aeronautical are fabricated from AMS 6250 or the national emergency substitute AMS 6260.¹ One forging from each lot received is sent to the laboratory and AMS hardenability sections² cut from it. These sections are normalized and hardened,

¹ Chemical analysis of the two steels:

Element	AMS 6250 (SAE 5310) Per Cent	AMS 6260 Per Cent
C	0.08-0.13	0.08-0.13
Mn	0.30-0.60	0.70-0.90
P	0.040 max.	0.040 max.
S	0.040 max.	0.040 max.
Si	0.20-0.35	0.20-0.35
Ni	3.25-3.75	2.00-2.50
Cr	1.25-1.75	0.80-1.10
Mo	0.30-0.40

² AMS hardenability specimens have sections $\frac{1}{2}$ or $\frac{3}{4}$ in. in thickness and not greater than 2 sq. in. in area, cut to represent an area half way between the center and outside of the bar or forging. These sections are ground and copper plated before being hardened.

hardness values being recorded after each operation. Since it is desirable to maintain a minimum hardness value after normalizing, it is necessary to know whether each lot will reach this hardness without receiving special treatment. The rough forgings are to be normalized and annealed to a Brinell hardness of 223-255. Most lots of AMS 6250 are well above this range after normalizing, in contrast to SAE 4620 or lower alloy grades used more frequently in the automotive industry. Occasionally,

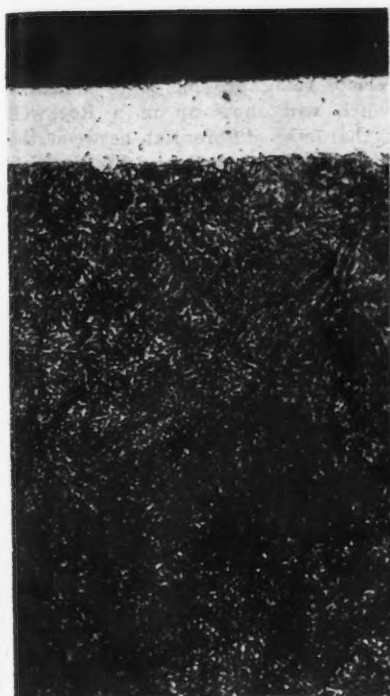


FIG. 1—Carburized specimen of AMS 6250 steel etched with 2 per cent nital, showing little evidence of decarburization due to removing from furnace at 1700 deg. F. and pit cooling (500X).

however, a heat of AMS 6250 with borderline hardenability will be encountered in which accelerated cooling hardness of the laboratory test is outside the normal range. Recording the hardness in sections enables these heats to be segregated by the production department for special treatment.

Normalizing temperature for the forgings is 1700 deg. F. and if the hardness is above 223-225 Brinell, that particular lot will be annealed, ordinarily at 1000 deg. F., but varying with the heat of steel. Machinability tests have shown that an optimum combination of tooth surface finish and cutting tool life exists at this hardness range. At the same time less effort is expended grinding off burrs formed at the edge of the teeth during rough cutting, if the hardness is held above 223 Brinell rather than at lower values where tool life might be increased. Particular freedom is had also in this hardness from ragged tears on the tooth surface which are encountered during the rough cut and which are of sufficient severity to persist on the shaved surface of the finished gear.

After the normalize-anneal, the gear forging leaves the heat treating department for rough machining, copper plating and semi-finish machining. When it returns it is a

nearly finished gear blank, and metallurgical surface carbon control will then determine whether an accurately shaved profile will meet the severe requirements of engine testing.

Carburizing Practice

The first problem in the final heat treatment is that of insuring optimum carbon concentration in the carburized surfaces. Carburizing is done in Leeds & Northrop pit type carburizing furnaces with a vaporized and cracked mixture of isopropyl alcohol and nitromethane as the carburizing agent. Fluid flows to the furnace are calibrated in advance for a given carburizing time and load area. They are set up to produce a case carbon content of approximately 0.90 per cent for the first 0.005 in., because fulfillment of this requirement insures a good depth hardness curve and a minimum amount of the retained austenite.

In some plants the problem of retained austenite has been approached through the use of a refrigeration treatment, the function of which is to cause transformation of any retained austenite into the harder martensite constituent. Unfortunately, however, this transformation is accompanied by a 3 per cent increase in volume and if the amount of austenite is sufficient, the volume change can produce internal cracks in the carburized case. Much more work must be done to prove that this treatment can be used entirely free from such trouble. In the meantime it is felt that it is an abortive method, since it sanctions improper carbon control in carburizing in the first place. If surface carbon concentrations are held between 0.90-1.00 per cent and quenching temperatures are not excessive, there is little need to worry about excess retained austenite.

There is one difficulty in meeting this requirement in fluid carburizing and that is the necessity of maintaining perfect furnace closures. Low carbon concentrations mean low fluid flows and consequently less gas in

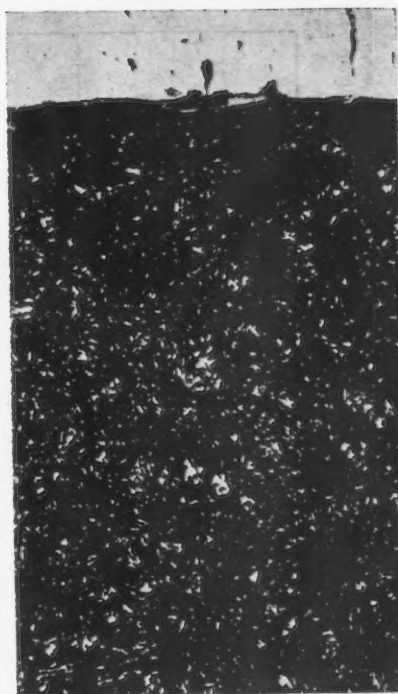
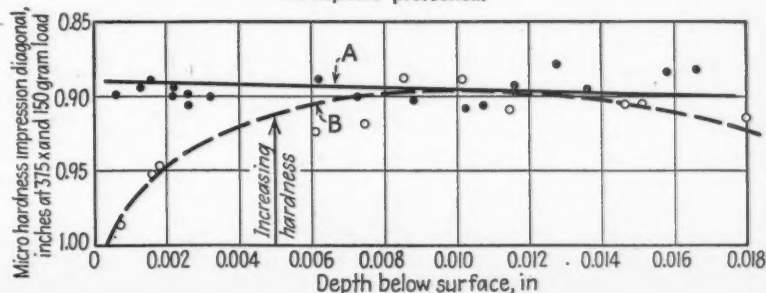


FIG. 2—Carburized specimen of AMS 6250 steel etched with 2 per cent nital. Sample was furnace cooled after carburizing. Structure is evidently higher in carbon than case shown in Fig. 1 but contrast is not sufficient at surface for accurate evaluation (500X).

the furnace. Small furnace leaks, therefore, dilute the gas rapidly and result in too low a carbon concentration or excessive carburizing time. In order to avoid this trouble, furnace pressure is checked before and during each carburizing load to determine the tightness of the furnace. Failure of a furnace to meet pressure requirements before a load is placed in it calls for a complete check up by the maintenance department.

When necessary, the furnace is torn down and rebuilt. In this case sealing efficiency is checked before the heat is turned back on, by metering a definite amount of compressed air to the cold retort and requiring

FIG. 3—Depth-hardness curves for: (A) sample cooled to 1100 deg. F. in carburizing furnace and (B) sample removed at 1700 deg. F. and cooled in standard pit with no atmosphere protection.



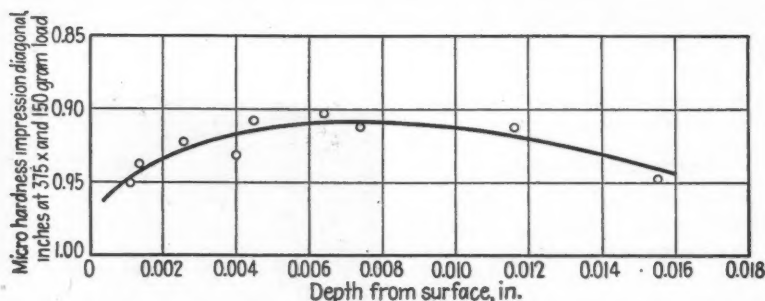


FIG. 4—Depth-hardness curve for sample removed from carburizing furnace 1500 deg. F. and cooled in gas filled pit. Slight decarburization still present.

a certain pressure buildup before the furnace can be released for production use. If poor pressure is obtained on a furnace containing a load of shaved gears, an immediate effort is made to reseal the top seal. If all efforts to increase the pressure buildup are to no avail, the load of gears is held after carburizing for a microhardness check by the laboratory. More will be said concerning this check later.

Pressure-Tight Furnaces

Aside from the factor of gas leakage and the resultant low carbon cases or excessive carburizing times, for shaved gears, the most important point is that low pressures will result in decarburization during cooling. To explain this statement it is necessary to review the standard carburizing and cooling procedure used with pit type carburizing furnaces. This consists of holding the load in the furnace until the required case depth is obtained and then transferring the load to a brick lined cooling chamber which may or may not contain protective atmosphere. During the transfer the hot load of carburized parts acts like a huge chimney and convection currents of air rush up through the red hot parts. This causes considerable decarburization of the parts in the bottom of the load and this decarburization will continue in the cooling pit. There are a number of ways of minimizing this type of decarburization. Steel "bell

jars" can be placed over the load during the transfer to curb convection; heavy gas or fluid flows can be used prior to "pulling" the load so that a protective blanket of soot is left on each part, or protective atmosphere can be placed in the cooling pit with a pilot flame to prevent explosions.

All these expedients are used to decrease decarburization, but they are all dependent on the human element and all of them if used together will still not entirely eliminate decarburization. It has been generally agreed that it is impossible to remove a load of parts at 1700 deg. F. from a carburizing furnace without encountering decarburization. This conclusion has obviously led to furnace cooling. However, it takes a full day to cool a pit furnace with a 20 x 48 in. retort to a temperature at which maintenance work can be done. If production cooling had to be done in this manner, it would, of course, result in excessive expense and three or four times the normal furnace capacity. In addition slow furnace cooling causes excessive surface carbon concentrations and poor microstructures. As a result the problem boils down to determining the maximum temperature at which parts can be removed from the furnace and then finding a way to speed normal furnace cooling so as to save manufacturing time, expense and quality.

Before proceeding further with this discussion it is necessary that some

clarification be made of the degree of decarburization being discussed. The term is not used in the sense of ferrite being present or to a degree which will show up in a Rockwell C. hardness differential between the surface and a point 0.005 in. below the surface. By the same token it may not even show up as a change in the shade of the microstructure or in a difference in the 15N superficial hardness at the surface and 0.005 in. below.

Some of the decarburization will be found in successive carbon analyses if the cuts are 0.002 in. thick or less. Most of this decarburization can be detected by the microhardness tester, if readings are taken on a cross section within 0.0005 in. of the surface. Both these latter means are destructive tests and in the former case, are quite time consuming. Therefore, they should be used as a means of setting up a foolproof process rather than as a means of routine inspection on each part or load of parts. Examples of the minuteness of this decarburization and the difficulty in detecting it are shown in the following series of hardness values taken on test pieces from the bottom pot of standard carburizing loads which have been pit cooled:

Standard Rc	Practice 15-N	Furnace Cooled Rc	15-N
63	92	62	92
62	92	62	91
62.5	93	61	92

Since the specifications for case hardness are 60 Rc or a superficial hardness of 90 on the 15-N scale, there is no reason to suppose that the standard pieces are decarburized. Furthermore, there is no noticeable difference in the photomicrographs of a sample of each group as shown in Figs. 1 and 2. However, from the microhardness curve shown in Fig. 3 for these same two samples it will be noted that the furnace cooled sample holds its hardness right to the surface while the standard sample shows a decided drop, starting at about 0.004 in. under the surface.

The scale used on this and succeeding charts needs some explanation. While readings were made with a Vickers diamond pyramid hardness indenter on a cross-section of a tooth, it was not possible to use standard loads ranging from 5 to 50 kg., because the indentation would have been too large when measuring the hardness of case a thousandth or so from the edge of the section. Instead for this particular analysis, a 150 gm. load was used and the microhardness recorded in terms of the length of the diagonal of the impression in inches

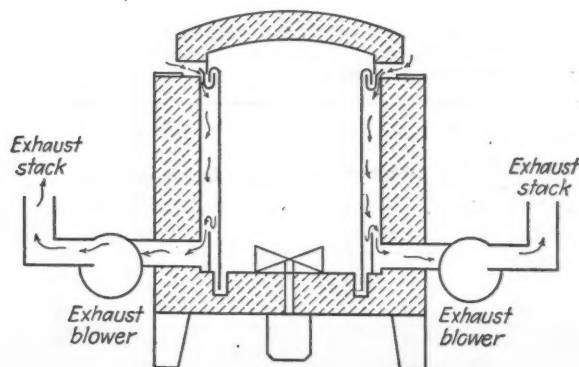
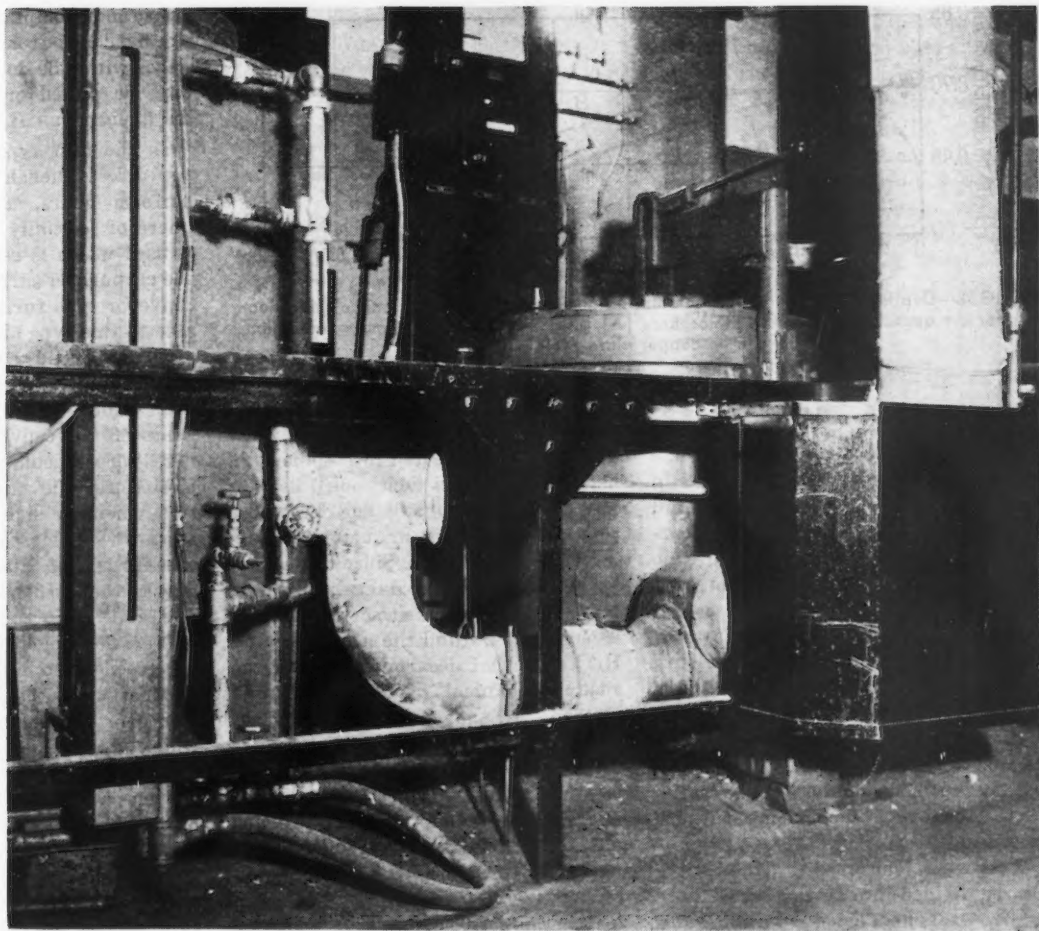


FIG. 5—Sketch of cross-section of carburizing furnace with blower cooling attachments. In production both units would be connected to one blower and one exhaust stack.

FIG. 6—Actual exhaust fan cooled furnace installation corresponding to Fig. 5.



when viewed under a 375 X microscope. Hence, on this scale, the smaller the diagonal, the higher the hardness. (Standard Vickers hardness numbers involve the reciprocal of the square of the diagonal in millimeters). No attempt has been made to convert the values recorded on the charts into VHN or standard diamond pyramid hardness numbers. The values given should be regarded as purely comparative for this particular class of carburizing steels.

With decarburization of this degree in mind we can now continue the discussion of cooling subsequent to carburizing. A number of automotive gear manufacturers are cooling critical parts to 1500 deg. F. before pulling the load. Since it may take 2 hr. to cool to this temperature it represents almost a practical limit to such cooling if furnace capacity is held within existing limits. At the same time, however, it is felt by a number of these manufacturers that gears cooled to this temperature and then transferred to a gas filled cooling pit are decarburization free. However, a microhardness curve for a sample treated by this method, Fig. 4, still indicates appreciable decarburiza-

tion. The important item is that freedom from decarburization is entirely dependent upon the operator and the speed with which he effects the transfer.

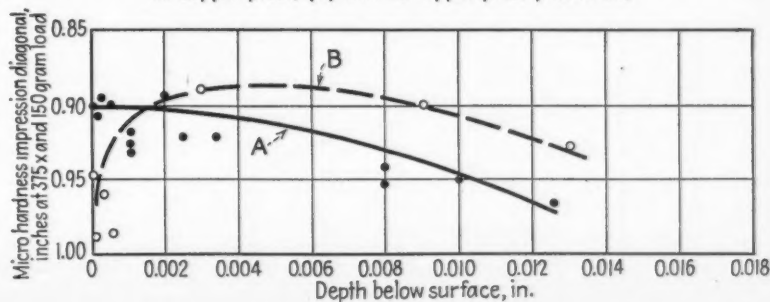
Forced Furnace Cooling

With this in mind and the knowledge that 1100 deg. F. was a safe temperature for removing the load (See Fig. 3), a forced cooling system was designed in conjunction with the furnace manufacturer. This so-called blower-cooling system is sketched in Fig. 5 and a photograph of one of the units is shown in Fig.

6. The principle, it will be noted, is simply that of sucking a column of cooling air down between the retort and the brick lining and exhausting the hot air through an auxiliary stack. A suction unit is placed on each side of the retort and the blower exhaust from both units is sent out through one stack. With such an arrangement a furnace can be cooled with a full load from 1700 to 1100 deg. F. in 45 min.

It will now be understood why furnace pressure during the carburizing cycle and the resultant seal efficiency is important. The suction ac-

FIG. 7—Depth-hardness curves for samples annealed after carburizing: (A) with 0.0003 in. copper plate, (B) with no copper plate protection.



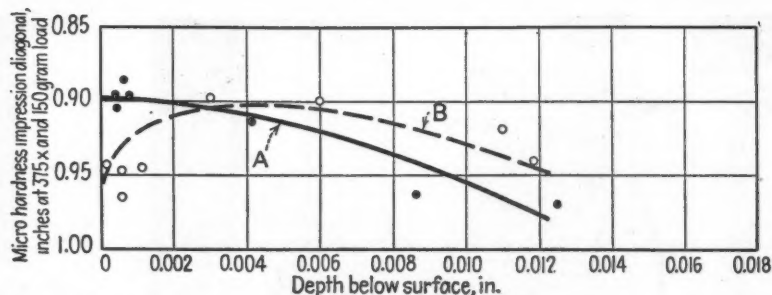


FIG. 8—Depth-hardness curves for samples hardened from conveyor furnace (side door for die quenching) with lean atmosphere (A) with 0.0003 in. copper plate protection, (B) with no copper plate protection.

tion of this air column in conjunction with the diminishing gas volume in the retort during cooling can pull enough air into the retort to decarburize the gears while still in the furnace. The fluid pump is not shut off until just before the load is removed so that enough gas is formed in the furnace to keep this pressure differential as low as possible. This method of cooling from carburizing is considered a milestone in the road of metallurgical surface control and will be outmoded only when a satisfactory bell-type carburizing furnace is put on the market.

Following carburizing, the gears can be divided into two classes—those which are annealed to permit additional machining before hardening and those which are not annealed. Each of these types can be further subdivided into simple gears on which there is apt to be little distortion and are free quenched and those which are apt to have a large amount of distortion and must be die quenched. Again the primary point of importance on the shaved gear is protection from decarburization and each operation will be discussed separately with this in mind.

Isothermal Anneal

The anneal following carburizing is a so-called cycle or isothermal an-

neal. Parts are heated to 1380 deg. F., held for 1 hr., and then cooled as rapidly as possible to 1100 deg. F., where they are held for 2 hr. before removing from the furnace. Since these temperatures are in the dangerous range for using protective atmospheres high enough in CO (and the accompanying H_2) to prevent decarburization of the case, mechanical protection is used instead. All shaved parts which must be annealed after carburizing are given a 0.0003 in. copper plate prior to the anneal. Fig. 7 shows the microhardness curves of hardened parts which had been previously annealed with and without such protection. This annealing treatment leaves the core hardness at about 12 R_c and the case between 15 and 27 R_c, depending upon the size of the annealing load and its resultant cooling rate between 1380 deg. F. and 1100 deg. F. Gears which have been annealed leave the heat treating department once more for such drilling or milling operations as are necessary and return when they are ready for hardening.

Gears of uniform or heavy sections which distort very little during carburizing are hardened in pusher type, complete muffle furnaces in which the parts go directly from the protective atmosphere into the quenching oil without contacting the air. Gears of

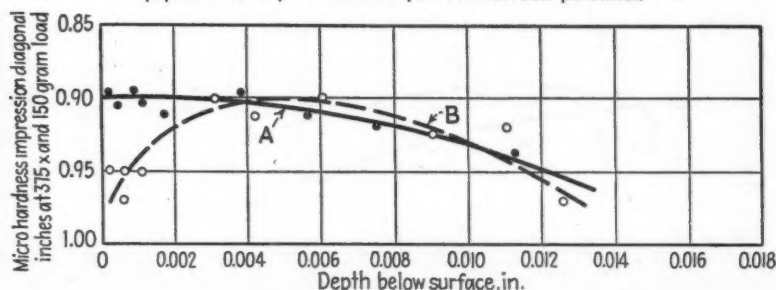
thin and complicated cross-sections are hardened from conveyor type furnaces with side doors from which they may be pulled off the conveyor and die quenched.

In the first type of furnace where the direct quench is used for small uniform gears, a protective atmosphere of partially combusted city gas is used which is essentially neutral to the carburized surfaces. However, the conveyor type furnace is not so amenable to this type of protection because of the difficulties connected with building a purging chamber on the side door which will permit moving the gears off the conveyor into the chamber, perpendicular to the conveyor motion for die quenching. As a result, when the side door is opened the protective atmosphere is diluted by the inrush of air and considerably lowers the carbon content which can be stabilized in this protective atmosphere. To avoid the dangers of making freedom from decarburization dependent upon the length of time the side door is held open, shaved gears which must be die quenched are also protected mechanically by 0.0003 in. copper plate. Fig. 8 shows the microhardness curve for carburized surfaces hardened in a conveyor furnace with and without this copper plate protection. As in the case of the decarburization occurring during cooling from carburizing, removal of 0.004 in. of stock by grinding will completely remove this decarburization on a ground gear and make unnecessary these extra precautions which are used on the shaved gear.

Testing Carbon Potential

For gears which are hardened from the pusher furnaces and protected on carburized areas only by an atmosphere, the determination of the carbon potential of that atmosphere becomes quite important. As already noted the microstructure is not a sensitive enough indication of decarburization. While the microhardness curve gives information enough, it is too laborious a routine test and involves either destructive inspection of a part or the smaller mass effect of a test piece. A simple test has been devised to determine the actual carbon potential of the protective atmosphere, and the air-gas ratio at the atmosphere generator is then adjusted to maintain a carbon potential between a 0.75-1.00 per cent (safety above eutectoid for AMS 6250 steel). The device used in this test is a small carbon combustion furnace with a silica muffle. Samples of steel chips, one machined from case and the other

FIG. 9—Depth-hardness curve for samples hardened from complete muffle, continuous type under pusher furnace: (A) with atmosphere of 0.90 per cent carbon potential, (B) with atmosphere of 0.20 per cent carbon potential.



from core areas of AMS 6250 are placed in combustion boat, inserted in the muffle at standard hardening temperature and the protective atmosphere from the production furnace passed through the silica muffle. In 5 to 6 hr. both samples of chips have arrived at the same carbon content which is beyond doubt the carbon potential of the protective atmosphere. The importance of maintaining this potential above eutectoid is shown in Fig. 9 which shows the microhardness curve for carburized samples hardened in atmosphere of 0.20 per cent carbon potential and 0.90 per cent carbon. Here again it will be noted that the amounts of decarburization being discussed are important only for shaved or finish cut gears where no further stock is removed. Even on this type gear the importance is further limited to those gears where unit loading is very high. Aircraft gears in an engine whose weight

has been reduced to less than 1 lb. per hp. fall largely in this class.

Following the hardening operation all gears are tempered for 4 hr. at 250 deg. F. minimum and then checked on the Rockwell C and 15-N superficial scales for case hardness. If there is any doubt about carburizing furnace pressure or hardening atmosphere carbon potential, a gear from that particular load may be sectioned and a microhardness curve run on the polished cross-section. In most cases careful control of the processes can avoid this extra operation and the finished gear can be guaranteed to possess a surface of maximum hardness.

Cleaning methods after each treatment are limited to very light grit blasting and stripping of any residual copper in a chronic acid bath.

The heat treating methods described above may appear involved and expensive to the smaller manufacturer

having highly skilled personnel and several reliable salt baths. It is granted that there is much to be said for salt bath heat treatment for a few file hard parts, but for the mass production of highly loaded aircraft engine gears the outlined procedures offer the following advantages over salt bath heat treating to the quality manufacturer:

1. Freedom from corrosion due to salt remaining in recesses of intricate gears.
2. Quality control of the process as opposed to batch control for each small lot.
3. Ability to die quench complicated gears which distort during previous carburizing.
4. Responsibility for metallurgical quality fixed with supervision, the laboratory and automatic instruments rather than the individual worker.

Mill Rolls Accurate Rounds

A LARGE percentage of the product of the new type vertical precision mill built by Mackintosh-Hemphill Co., Pittsburgh, can be rolled within cold drawn tolerances. It is designed to roll accurate rounds from $\frac{3}{8}$ to $1\frac{1}{2}$ in. diameter. The machine can also be set up to edge shapes and flats.

Intended to be located immediately after the finishing stand of the tandem mill train, the roll stand consisting of a pair of vertical rolls, can be moved horizontally to line up the pass line with any pass in the horizontal rolls of the finishing stand. The rolls also can be adjusted vertically, so that any pass of the vertical rolls can be lined up with any pass of the horizontal rolls in the tandem mill. Roll housings of the precision mill are also adjustable with respect to each roll to control the size of the product.

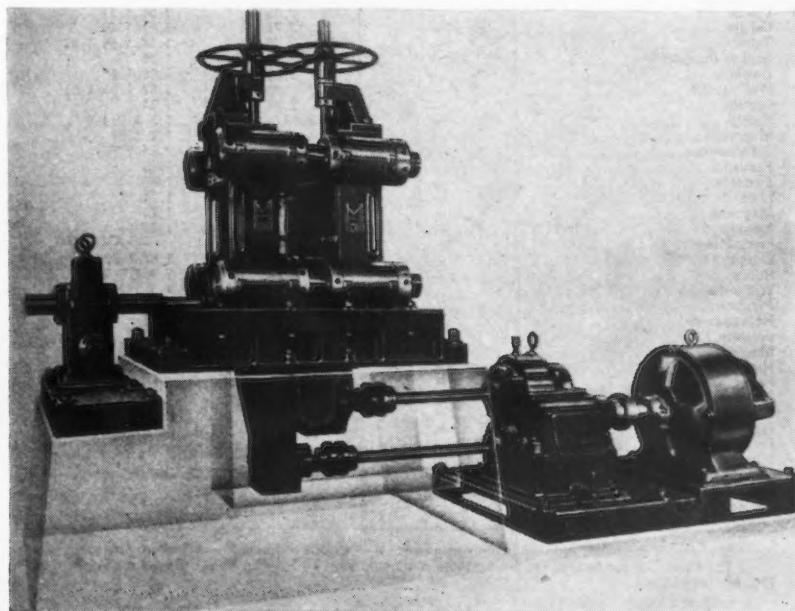
The rolls are 12 in. in diameter by 15 in. long and are supported by anti-friction roll neck bearings in a cast steel carrier. The carrier is adjustable vertically in a cast steel housing and is locked in place to eliminate any movement due to rolling pressures. This housing is connected to a similar housing, holding the opposite roll, by means of four heavy columns. Distance between the roll housings is adjustable by nuts on both sides of one housing. Vernier scales are provided on all adjustments to make possible accurate control of the

size of the roll pass and hence the rod.

The stand is mounted on ways in a heavy base, and is adjustable horizontally by means of a screw jack, which is operated by an electric motor and worm gear drive. The mill is driven by a 100 hp. d.c. mill type variable speed motor through individual mill spindles and bevel gear drives. To allow for horizontal movement of the roll housings, the pinion

stand ends of the mill spindles are provided with splines which slide in the hollow pinions. The bottom ends of the roll spindles are also splined so that they can slide up or down in the bevel gears to allow for vertical adjustment of the rolls. The rolls may be removed by disconnecting the coupling box and lifting out the complete roll carrier through the top of the mill stand.

MACKINTOSH-HEMPHILL vertical mill which rolls rounds ranging in diameter from $\frac{3}{8}$ to $1\frac{1}{2}$ in.



Identifying the Constituents of W

CHEMICAL analysis of welding rod coatings is insufficient for the identification of their components as usually radicals only are estimated, and accurate correlation of the analytical results with the properties of electrodes is almost an impossibility. Mineralogical examination of the coating constituents must, therefore, be resorted to, and this combined with the results of a chemical analysis can give information of extreme interest.

To facilitate examination of electrode coatings, the author has compiled a scheme utilizing the mineralogical and chemical attributes of the most common components. If applied with the usual precautions

and care, this methods gives results fairly close to the truth. The method can only be applied to the ferrous type of welding rod, as the components of nonferrous electrodes are of such reactivity, both with themselves and with the reagents employed in the methods of separation as to preclude any all embracing scheme. It has been found, moreover, that in the majority of cases, the coating compositions of nonferrous electrodes are relatively simple as compared with their ferrous counterparts and chemical analysis usually suffices to give all the information required.

Materials to be Identified

Apart from the binding agents, sodium and potassium silicate, in the coatings of ferrous electrodes the

constituents most commonly found are:

Rutile	Asbestos	Powdered metals
Ilmenite	Magnetite	Mica
Quartz	Hematite	Witherite
Feldspar	Pyrolusite	Enstatite
Kaolin	Hausmannite	Cryolite
Calcite	Siderite	Graphite
Dolomite	Iron powder	Magnesite
Fluorspar	Ferro-alloys	Alumina
Talc		Organic matter

To these might be added several materials which are claimed in patent specifications, but which are isolated instances of little importance, such as powdered glass, carborundum, braunite, rhodocrosite, etc.

The essential properties of the more common of these compounds are given in Table I.

It will be seen from Table I that it is possible to segregate the various substances by differences in magnetic susceptibility, into three groups, each of which is further subdivided by density determinations, while the final observation of refractive index or of chemical reactions will usually be sufficient to enable the individual constituents to be identified. The following scheme may be employed:

Scheme of Separation

1. *Initial Treatment*—After being detached piecemeal from the core wire, the coatings of three electrodes from a batch (four if they are only 14 in. in length) are boiled for 20 min. with 200 ml. of distilled water in order to dissolve the sodium and potassium silicates usually employed as binding agents. The solution obtained should be examined chemically, or otherwise, for radicals other than K_2O , Na_2O and SiO_2 , which would indicate the existence in the coating of water-soluble materials other than waterglass—probably inorganic salts, but it should not be omitted to test for such binding agents as dextrine, starch, etc.

After this boiling, it may usually be assumed that the binding silicates have been dissolved and the grains of the coating constituents freed. The suspension is filtered hot through a Whatman No. 2 paper, and washed thrice with boiling water, the filtrates being subjected, as indicated above, to tests for radicals other than those of Na and K silicates—in actual prac-

TABLE I
Physical Properties of Common Constituents of Electrode Coatings

Substance	*Magnetic Property	Density	Index of Refraction μ
Wood flour	—	1.5-1.6	—
Bentonite	—	2.00	1.52 (av.)
Graphite	—	2.16	—
Asbestos	—	2.25	—
Gypsum	—	2.32	1.58, 1.5
Brucite	—	2.39	1.58, 1.58
Bauxite	—	2.55	1.57
Feldspar	—	2.55 (av.)	1.52, 1.53, 1.53
Kaolin	—	2.62	1.56
Quartz	—	2.65	1.55, 1.54
Calcite	—	2.71	1.63, 1.49
Talc	—	2.75	1.54, 1.59, 1.59
Sodium fluoride	—	2.79	1.34
Dolomite	—	2.85	1.68, 1.5
Wollastonite	—	2.88	1.62, 1.63, 1.63
Cryolite	—	2.98	1.34
Biotite	—	2.98 (av.)	1.5, 1.6, 1.6
Magnesite	—	2.99	1.7, 1.61
Carborundum	—	3.17	2.65, 2.7
Fluorspar	—	3.19	1.43
Enstatite	—	3.20	1.67
Lime	—	3.40	1.84
Magnesia	—	3.70	1.74
Alumina	—	3.70	1.77
Ferrosilicon†	—	3.80	—
Siderite	—	3.86	1.67, 1.63
Rutile	—	4.22	2.9, 2.6, 2.6
Witherite	—	4.32	1.5, 1.7, 1.7
Pyrolusite	+	4.75	—
Hausmannite	+	4.88	2.46
Ilmenite	+	4.90	—
Magnetite	M	5.05	—
Hematite	+	5.10	3.22, 2.94
Ferrotitanium†	+	5.69	—
Ferrovandium†	+	6.66	—
Chromium powder	—	6.92	—
Ferromanganese†	m	7.13	—
Ferro manganese	—	7.49	—
Iron powder	M	7.88	—
Nickel powder	—	8.9	—
Ferromolybdenum†	m	9.5	—
Tungsten powder	—	19.3	—

* M = highly magnetic; m = moderately magnetic; + = weakly magnetic; — = non-magnetic.
† The figures for the ferro-alloys are for those containing 60% Si, 65% Ti, 60% V, 75% Cr, 85% Mn, and 70% Mo respectively.

Welding Electrode Coatings

By R. C. Vickery, Ph.D., M.Sc.

tice this is confined initially to tests for anions other than Si----

The filter carrying the disintegrated coating is dried in a hot air oven at 105-110° C.; higher temperatures than these are inadvisable owing to the possible decomposition of carbonates or organic matter.

One point which might be noticed during this preliminary treatment, is the odor present while the suspension is being boiled, as it has been observed¹ that interaction occurs be-

¹Bliss "Footprints," June 1934, published by Foote Mineral Co., Philadelphia.

tween ferromanganese and sodium-silicate solution resulting in the formation of nascent hydrogen and acetylene with several other volatile, odoriferous hydrocarbons. If, therefore, such an odor be noticed it may be safely concluded that ferroalloys are present.

When dry and removed carefully from the filter (taking care not to injure the paper) the finely divided mixture is passed through a 100-mesh sieve. It is possible that a certain amount of material will be retained by the gauze at first, but unless this residue shows evidence of being particularly different from the bulk of the coating it is crushed in an agate mortar until all is passed through the sieve. There are relatively few materials employed in electrodes today which are much larger than 90-100 mesh, and when a large amount of material is retained by a sieve of the former size it is usually homogeneous and may easily be identified, such as tungsten carbide.

As far as the identification of the components is concerned, however, sieve-analysis is of little value as the grain size of powdered minerals varies so greatly some manufacturers, for instance, employing calcium carbonate as a rather coarse marble powder while others use air-floated chalk.

2. Preliminary Examination—As a preliminary to actual separation, it is usually advisable to examine the powdered coating microscopically under direct lighting. Although the author employs a binocular microscope magnifying 60X, quite good observa-

... Since there is practically no published information on arc welding electrode coating compositions, it is necessary to examine the coatings of existing electrodes when attempting comprehensive research on the subject. Since chemical analysis is of little avail, the author has formulated a scheme involving magnetic and gravitational separation that gives surprisingly accurate results. The material originally appeared in the British journal, *Metallurgia*.

tions may be made with magnifications as low as 25 diameters. This micro-examination is essentially for the identification of organic materials and asbestos, but will also give to an experienced worker a useful indication of what substances may be anticipated in the separations.

The organic material met with at this stage is in nearly every case a form of cellulose, usually wood flour of some description. Fig. 1 illustrates the microscopical appearances of some of the different types of cellulose encountered as well as the microscopical appearance of asbestos powder.

3. Magnetic Separation—The microscopical identification of minerals by direct vision only, without the aid of polarized light, is a procedure in which one can only attain efficiency by practice, and a well experienced worker can occasionally dispense with any further examination. With the recent advances in the manufacture of welding electrodes, however, the complexity of the coating compositions renders direct visual identification a matter of increasing difficulty, especially where varying

amounts of different ferro-alloys are used.

After the preliminary microscopical examination, therefore, the mixture is extracted with a bar magnet over paper; this will remove iron powder, magnetite, and a little of the ferromolybdenum and ferrochrome. Electromagnet separation is then carried out on the residue in the usual petrological manner. The electromagnet employed by the author is similar to that described by Holmes.² The

²"Petrographical Methods and Calculations," London, 1921.

essentials of its construction are, a core of soft iron some 10 in. long, bent U-shaped with a curve of 1 in.

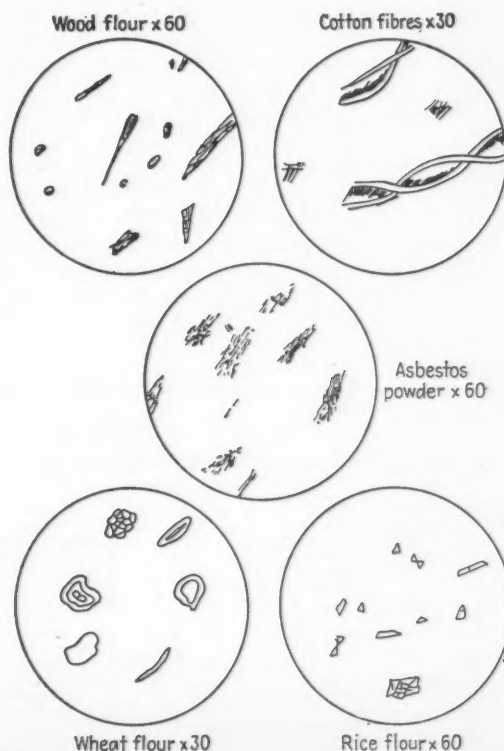


FIG. 1—Microscopic appearance of the different types of cellulose encountered, as well as asbestos powder.

TABLE II
Solutions and Mixtures for Density Separation

Components				Density
	Per Cent		Per Cent	
Bromoform.....	77	Benzol.....	23	2.45
Bromoform.....	91	Benzol.....	9	2.89
Methylene iodide.....	84	Benzol.....	16	2.90
Methylene iodide.....	92.5	Benzol.....	7.5	3.10
Methylene iodide.....				3.30
Thallium mercurous nitrate.....				5.30
Mercury.....				13.55

internal diameter to give arms about 4 in. long which are bound in opposite directions with seven layers of 40 turns each of 16 S.W.G. wire. The two movable poles piece are 1¼ in. wide and ¼ in. thick. Using as the source of current an 8-volt cell the moderately magnetic substances are attracted by poles ½ in. apart and feebly magnetic materials by poles ¾ in. apart. The orthodox technique of its use, however, considered somewhat tedious in that the current has to be switched off to enable the grains adhering to the poles to be removed with a camel's hair brush.

To avoid such a tedious operation the author inverts the magnet and places a tray of kraft paper over the poles as shown in Fig. 2. The sides of the tray are reinforced with thin card and the corners of one of the long ends left unsecured so as to form a hinged side which will turn down and facilitate removal of the contents of the tray. The inner surface of the tray is marked with two lines, thus producing three visual divisions which are marked consecutively A(m); B(+); and C(—). The material under examination is placed in the portion of the tray marked C(—) and the magnet activated by an electric current. After passing the mineral mixture over the poles of the magnet by moving the container backwards and forwards, etc., the tray is moved sideways so that compartment A is above the

poles. The more highly susceptible materials remain above the poles while the tray is moved and are deposited in section A. The process is repeated until no further grains follow the magnet into compartment A. A strip of card is then placed along the line separating the sections A and B. Employing a shorter distance between the poles, the sideways movement of the tray is repeated and the less attractive particles are deposited in compartment B. Thus the original mixture is divided into four portions corresponding to the magnetic susceptibilities of its ingredients: Highly magnetic (extracted by the bar magnet); moderately magnetic (m) weakly magnetic (+), and non-magnetic (—).

It is possible, in separation of the constituents of a commercial electrode coating, that one or more of these sections will be represented by an apparently homogeneous powder; if this homogeneity is confirmed by microscopical examination, no further separations need be carried out upon that portion of the material which may then be identified by the confirmatory tests indicated in Section 5.

Where the material in each compartment is heterogeneous, however, it must be subjected to separation by suspension in liquids of varying densities, as described below. One further point must be borne in mind, i.e., the possibility of impurities in substances rendering them more amenable to

magnetic separation than would be the pure material, for example, the inclusion in asbestos fibers of small amounts of magnetite, etc., would lead to the occurrence of asbestos in compartment A or B as well as C; further, in the case of carborundum, the methods of its manufacture are such as to include a fair amount of iron in the finished product, which might lead to the finding of this material also in a theoretically incorrect division.

4. Density Separations.—For this process it is necessary to employ liquids of varying specific gravity. Up to densities of 2.9 bromoform/benzol mixtures may be employed, the empirical values for some of these mixtures being shown in Fig. 3. From 2.8 to 3.3 admixtures of methylene iodide with benzol are used, the nominal densities attained being illustrated in Fig. 4.

It will be seen from Table I that these liquids are applicable only to the non-magnetic materials and that one-third of these have densities higher than 3.3. In view of this fact the author reverses the usual separation procedure in that he employs methylene iodide mixtures before those of bromoform. The operation of separation by these liquids is well known; for those not familiar with the technique, however, reference may be made to the works of Holmes², Milner³ and Raeburn⁴.

² "Sedimentary Petrography," 3rd Ed., London, 1940.

⁴ "Alluvial Prospecting," London, 1927.

After the "sink" and "float" process has been carried out with methylene iodide mixtures, the heavy minerals are separated via a tap funnel, filtered off and washed in the usual way with benzol. Further separation of the heavier material may then be carried out by the use of thallium mercurous nitrate^{5,6}, which in the fused state has a density of 5.3. Of the materials heavier than this, tungsten powder may be separated by the use of mercury. After removal by filtration of the solids suspended in the separating media, the filters and their contents are dried on a sand bath. The benzol, bromoform and methylene iodide employed are subsequently recovered by distillation, and employed for further separations.

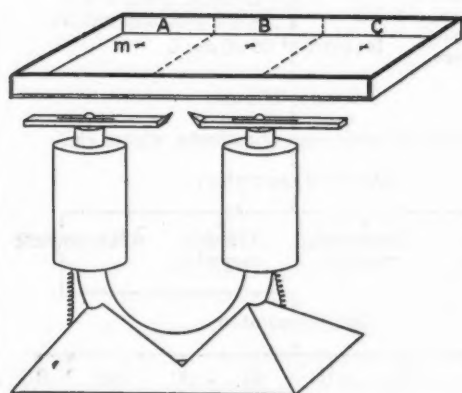
By use of solutions of the compositions indicated in Table II, it is possible to subdivide the non-magnetic substances into eight sections, so that by the employment of magnetic and density separations 11 groups of the coating materials are obtained (Table III).

5. Ultimate Identification—Group 1.

TABLE III
Electrode Coating Constituents Classified by Magnetic Property and Densities

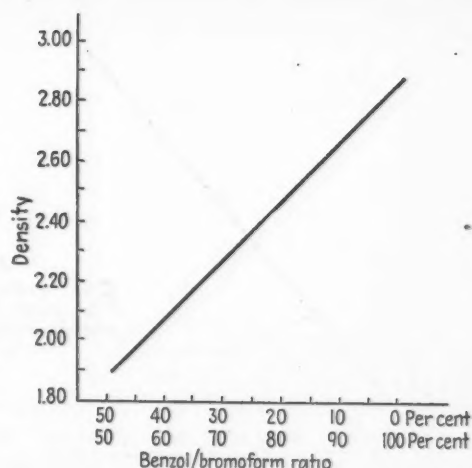
Group 1.—Highly magnetic: Magnetite, iron powder.	Calcite, talc, sodium fluoride, dolomite, wollastonite.
Group 2.—Moderately magnetic: Ferromolybdenum, ferrochromium.	Group 7.—Non-magnetic—D > 2.90, < 3.10: Cryolite, biotite, magnesite.
Group 3.—Weakly magnetic: Ilmenite, ferrovandium, hematite, hausmannite, pyrolusite.	Group 8.—Non-magnetic—D > 3.10, < 3.30: Carborundum, fluorspar, enstatite.
Group 4.—Non-magnetic—D < 2.45: Wood flour, bentonite, graphite, asbestos, gypsum, brucite.	Group 9.—Non-magnetic—D > 3.30, < 5.3: Lime, magnesite, alumina, ferroallicon, alderite, rutile, witherite.
Group 5.—Non-magnetic—D > 2.45, < 2.68: Bauxite, feldspar, kaolin, quartz.	Group 10.—Non-magnetic—D > 5.3, < 13.5: Ferrotitanium, chromium, ferromanganese, nickel.
Group 6.—Non-magnetic—D > 2.68, < 2.90:	Group 11.—Non-magnetic—D > 13.5: Tungsten powder.

D=Density



LEFT
FIG. 2—Apparatus designed by the author for electromagnetic separation of electrode coating materials.

RIGHT
FIG. 3—Empirical values of density D for benzol bromoform mixtures.



The two members of this group may be separated with ease by the use of fused thallium mercurous nitrate. By fusion of a mixture of the three substances, magnetite, iron powder and the thallium salt, it will be found on cooling that it is possible to cut the melt in two, thus attaining a complete separation. Since the salt is soluble in water, the powders may thus be obtained in the disintegrated state. Apart from the detection of Fe by the thiocyanate reaction, the density separation is sufficient for the identification of this group, although the possibility of contamination of the iron powder by ferromolybdenum and/or ferrochrome must be borne in mind and the heavier fraction from the melt separately tested for Cr and Mo as given in the following section.

Group 2. Although there is a fairly wide difference between the densities of the two ferro-alloys constituting this group, it is not possible to take advantage of it and reliance must be put upon chemical tests only. Differentiation may be made between the two alloys by identification of chromium and/or molybdenum by the use of the benzidine and α -benzoin-oxime tests respectively.*

Group 3. The main difficulty in this section lies in the differentiation between hausmannite and pyrolusite. Detection of manganese in the group by the bismuthate method will not specifically indicate the presence of either of them, and as their densities are relatively close, one must rely upon visual identification under the microscope; this is comparatively simple, for under direct lighting hausmannite appears of a brownish-black color, while pyrolusite is bluish-black, rather reminiscent of tempered steel. The presence of ilmenite may be confirmed or otherwise by the reaction obtained with tannic acid in oxalate solution* or with acidified

H_2O_2 . Ferrovandium is not so easily identified, but the acid peroxide test for Ti may be adapted for this purpose, as the red color produced in that reagent by Ti is removed by the addition of HF, whereas that obtained by V is not. In view of the presence of other iron compounds, the existence of hæmatite in this group is made known by its conversion to the highly

*"B.D.H. Book of Organic Reagents for "Spot Tests," 8th Ed., 1941.

*Schoeller and Powell. "Analysis of Minerals and Ores of the Rarer Elements." London, 1919.

magnetic Fe_2O_3 on heating. After subjecting the mixture on charcoal to red heat for a few minutes, any magnetite formed by reduction of the hæmatite may be readily extracted by the use of a bar magnet.

Group 4. Asbestos and wood pulp, if present, will already have been identified microscopically in the second stage of this examination. The observation of a red coloration im-

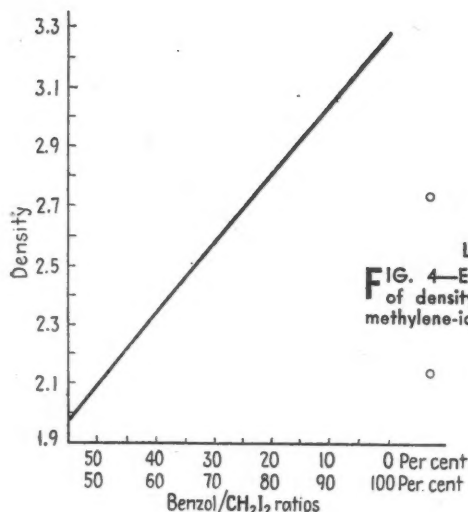
parted to a flame test is indicative of the presence of gypsum, this being confirmed if barium chloride reveals the existence also of sulphate. Similarly the detection in the mixture of magnesium by quinalizarin* is considered to indicate brucite. Bentonite being of an amorphous nature will readily absorb aqueous malachite green solution and the color remains after washing, while with the other materials present it is removed by warm water. The color of the graphite is its own confirmation and no further tests are required.

Group 5. This group may be subdivided by the employment of a liquid of D:2.60, but this is hardly worth while, as the members must ultimately be differentiated microscopically. As Al_2O_3 and SiO_2 are the predominating radicals in this group, chemical identification cannot be undertaken, and the only means of differentiating between the individuals is that of determining their indices of refraction.

TABLE IV

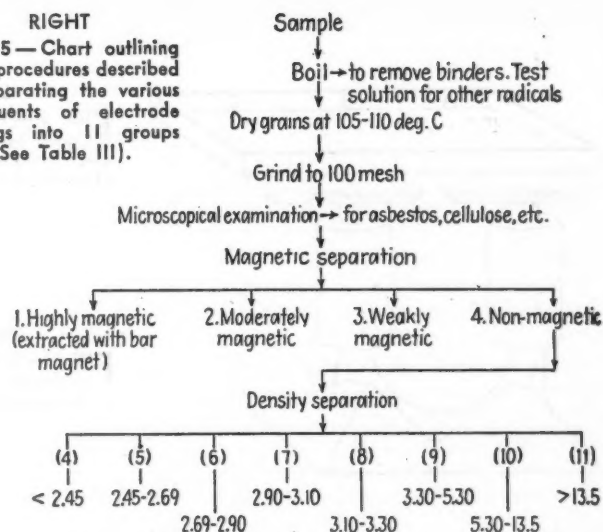
Actual Composition of Welding Electrodes Compared With Estimated Analysis

Electrode No.	Chemical Analysis	Materials Identified	Estimated Composition Per Cent	Actual Composition Per Cent	Error Per Cent
1	TiO_2	Rutile.....	50.0	49.0	+ 1.0
	SiO_2	Quartz.....	5.0	4.5	+ 0.5
	MnO.....	Kaolin.....	16.0	16.5	- 0.5
	Al_2O_3	Ferromanganese.....	16.0	16.5	- 0.5
	CO_2	Magnesite.....	13.0	13.5	- 0.5
	MgO.....	—	—	—	—
	FeO.....	—	—	—	—
	Ignition loss.....	—	—	—	—
	C.....	—	—	—	—
	100.4		100.0	100.0	—
2	CaO.....	Calcite.....	30.0	30.5	- 0.5
	F.....	Fluorapatite.....	37.5	36.5	+ 1.0
	Asbestos wrapping.....	Asbestos.....	15.2	15.5	- 0.3
	CO_2	Ferromanganese.....	3.0	2.5	+ 0.5
	Cr.....	Ferromolybdenum.....	3.0	3.0	Nil
	SiO_2	Ferrochromium.....	10.0	10.0	Nil
	FeO.....	Wood flour.....	2.0	2.0	Nil
	MnO.....	—	—	—	—
	Mo.....	—	—	—	—
	Ignition loss.....	—	—	—	—
	C.....	—	—	—	—
	99.9		100.7	100.0	—



LEFT
FIG. 4—Empirical values of density D for benzol-methylene-iodide mixtures.

RIGHT
FIG. 5—Chart outlining the procedures described for separating the various constituents of electrode coatings into 11 groups (See Table III).



Accordingly, a small representative portion of the mixture is examined microscopically dry, but under a cover-slip; when the grains have been focused, cinnamon oil ($\mu 1.53$) is permitted to seep between the slide and the cover-slip by capillarity; the apparent disappearance of any of the grains will indicate feldspars. When this observation has been made a piece of filter paper is applied to one edge of the cover-slip while a drop of brom-toluene ($\mu 1.55$) is placed at the opposite edge, thus by absorption of the cinnamon oil by the paper, the brom-toluene is drawn under the cover-slip to replace it. It is necessary to employ one drop of the second reagent for complete removal of the previous liquid, and another drop for observation. If any grains seem to disappear in brom-toluene they are taken to be quartz. This procedure is repeated with monobromo-benzol ($\mu 1.56$) for kaolin and ortho-toluidine ($\mu 1.57$) for bauxite. It must be remembered, however, that the indices of refraction given for the minerals are averages, so that the question of the proportion of mineral grains affected by each liquid must be taken into account when stating whether or not a mineral is present.

Group 6. The mixture is first extracted with cold 50 per cent acetic acid, and then with hot acid of the same concentration, the two extracts being collected separately. The cold extract is examined for Ca by the flame test and the hot extract for Mg with quinalizarin or "magneson." Positive results indicate respectively calcite and dolomite. Owing, however, to the association in occurrence of the two minerals it is necessary once more to take into account the approximate proportion of each element be-

fore concluding that one mineral is present to the exclusion of the other. The residue may contain talc, sodium fluoride, and wollastonite. The presence of fluorine, as indicated by a positive reaction with alizarin-S⁸ shows the presence of NaF. Talc and wollastonite are differentiated by their refractive indices employing bromoform ($\mu 1.59$) for identification of talc, and carbon disulphide ($\mu 1.63$) for wollastonite.

Group 7. The magnesite is first extracted with HCl, the solution being tested for Mg with quinalizarin or magneson. If fluorine can be detected in the residue by alizarin-S, cryolite is present, while biotite can be found by the use of bromoform ($\mu 1.59$) or cassia oil ($\mu 1.6$).

Group 8. The identification of fluorine indicates fluor spar, whilst enstatite will give a positive reaction to a test for Mg. Carborundum, in the commercial condition, may be easily identified by its color.

Group 9. In this group, the elements Ca, Mg, Al, Fe, Ti, and Ba may be identified when present by the use of the flame test, magneson, alizarin, thiocyanate, tannin, or rhodizonic acid,⁹ respectively. The identification of Fe is, however, rather ambiguous since that element may be present as ferrosilicon, siderite, or with titanium in rutile. The presence of SiO₂ in fair amounts would indicate the ferro-alloy, while siderite may be extracted with dilute acid and the thiocyanate test applied to the solution. If neither of these procedures yields a positive result then it must be concluded that the iron is present in the rutile.

Group 10. The components of this mixture may be ascertained very simply by examination for Ti, Cr, Mn, and Ni, this latter by use of dimethyl-

glyoxime, and the others by tests already enumerated.

Group 11. The sole member of this group—tungsten—is easily identified by its density and no further confirmation is usually needed. As the carbide is occasionally employed in electrodes, however, and would then fall into this group, it is well to remember that whereas the metal is soluble in hot, concentrated KOH, the carbide is not.

This scheme of separation is charted diagrammatically in Fig. 5.

Conclusions and Results

In the hands of an intelligent worker the procedures delineated in the previous sections will give quite good results, and, combined with the results of a chemical analysis enable a very near approximation to be made of the composition of the electrode coating. One point, however, must be made in the identification of the ferro-alloys; as yet it is not possible to differentiate between the high and low carbon varieties. It is possible that this differentiation might be attained by correlation of the exact densities of ferro-alloys with their carbon contents, but in practice, this would lead to lengthening of an already prolonged process.

As no method or procedure is worthy of attention until it has produced results of sufficient accuracy, the author appends in Table IV the results of an examination of two welding electrode coatings, of which the formulas were known to the supplier but were not divulged to the investigator until after the examination had been completed. It will be seen that the accuracy of the results obtained is well within the limits of percentage composition normally quoted in patent specifications.

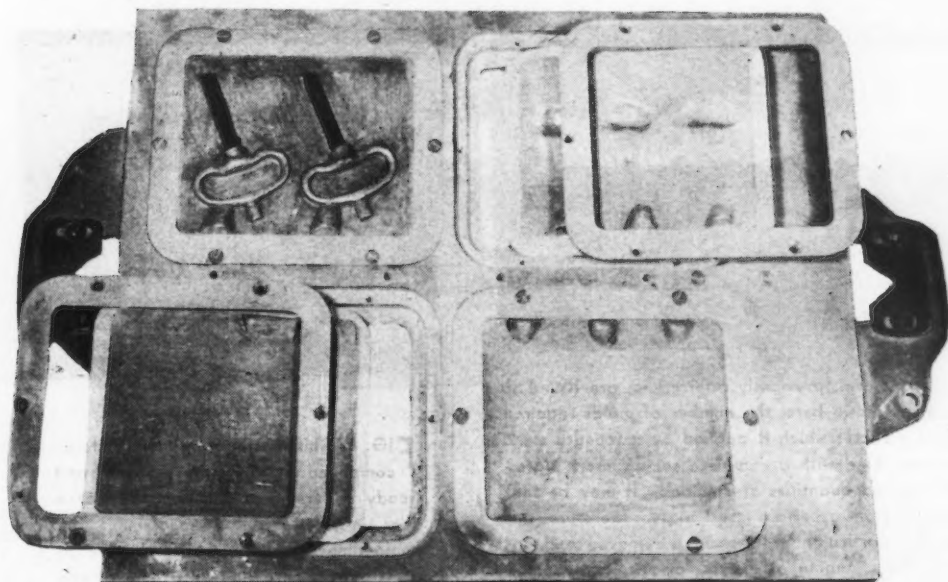
Casting Short-Run Variable Designs

By J. N. McLAUGHLIN
Production Superintendent,
Robert Mitchell Co., Ltd., Montreal

MANY foundries have short-run requirements of castings, principally copper-base or aluminum-base alloys, for the production of which it would not be profitable to make up standard match plates. Consequently the loose patterns frequently are used. As a result, the castings are of inferior quality as regards dimensional accuracy and not only are the production costs

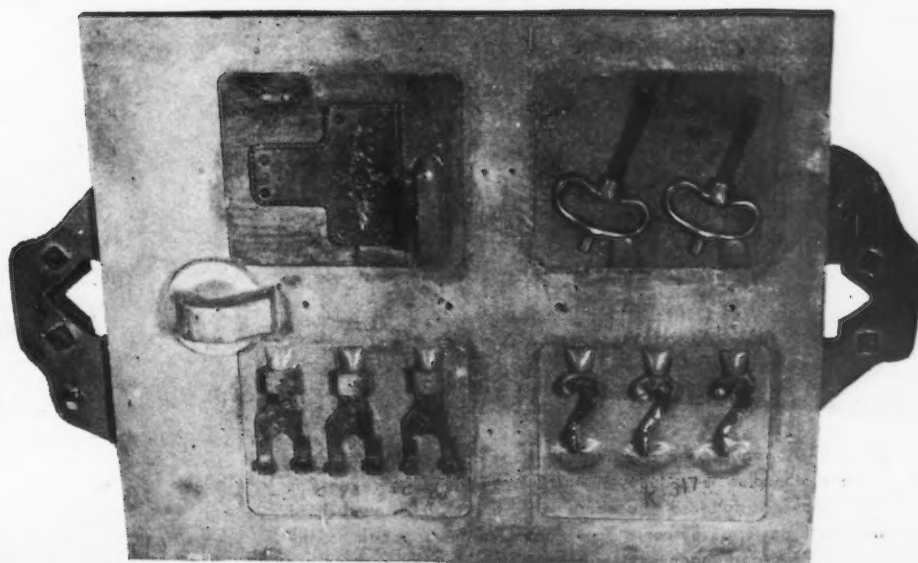
of the castings high, but also the cost of machining and finishing such castings is considerably increased.

The method which this article describes was devised with the object of obtaining the advantages related to match-plate production without incurring the full costs which would normally accrue from standard match-plate use.



LEFT

FIG. 1—A 14x16 in. match-plate, the external dimensions of which are standard. However, four apertures are cut therein, designed to receive removable frames, each containing a stone-compound insert plate.



RIGHT

FIG. 2—Sufficient space is provided at one end of the insert plate for the location of a skim core, as illustrated here, which is the reverse side of Fig. 3.

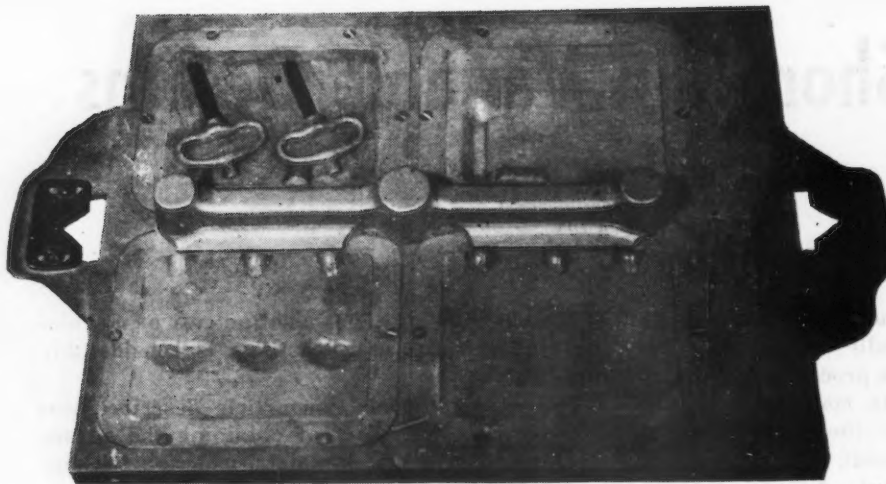


FIG. 3—Reverse side of Fig. 2. The master frame is issued is molders engaged on this short-run work and remains in his possession as part of the standard equipment of his machine.

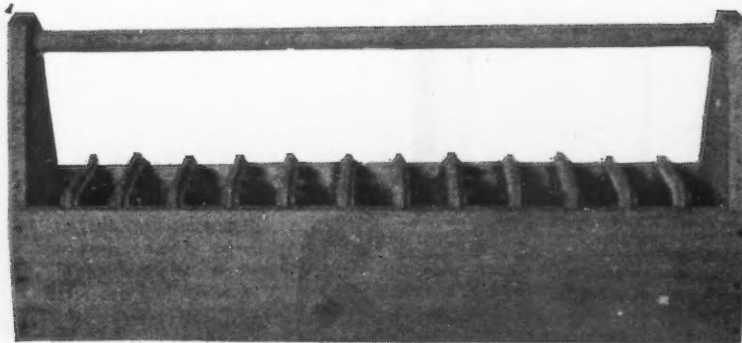


FIG. 4—The stone-compound insert plates, previously referred to, are issued to the foundry in a portable rack, as shown here, the number of molds required from each plate being marked on a sticker which is applied by a foundry clerk. The master frame, having been assembled with a complete set of insert plates, is placed in production and the required quantities are molded. It may be that a quantity of say 25 only is required from a certain insert plate. Therefore, this quantity having been produced, this particular insert plate is removed and another one inserted to replace it. The changing of insert plates is done by the molding machine operator.



ABOVE

FIG. 6—This master frame has a stone-compound insert plate finished and ready for removal. It may be noted that in-gates are made to meet the main runner, as seen in Fig. 3. The insert plate is now ready for removal and issue to the foundry for production, as previously mentioned in reference to Fig. 4.

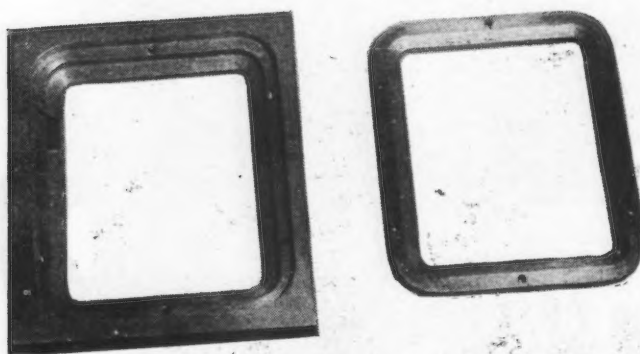
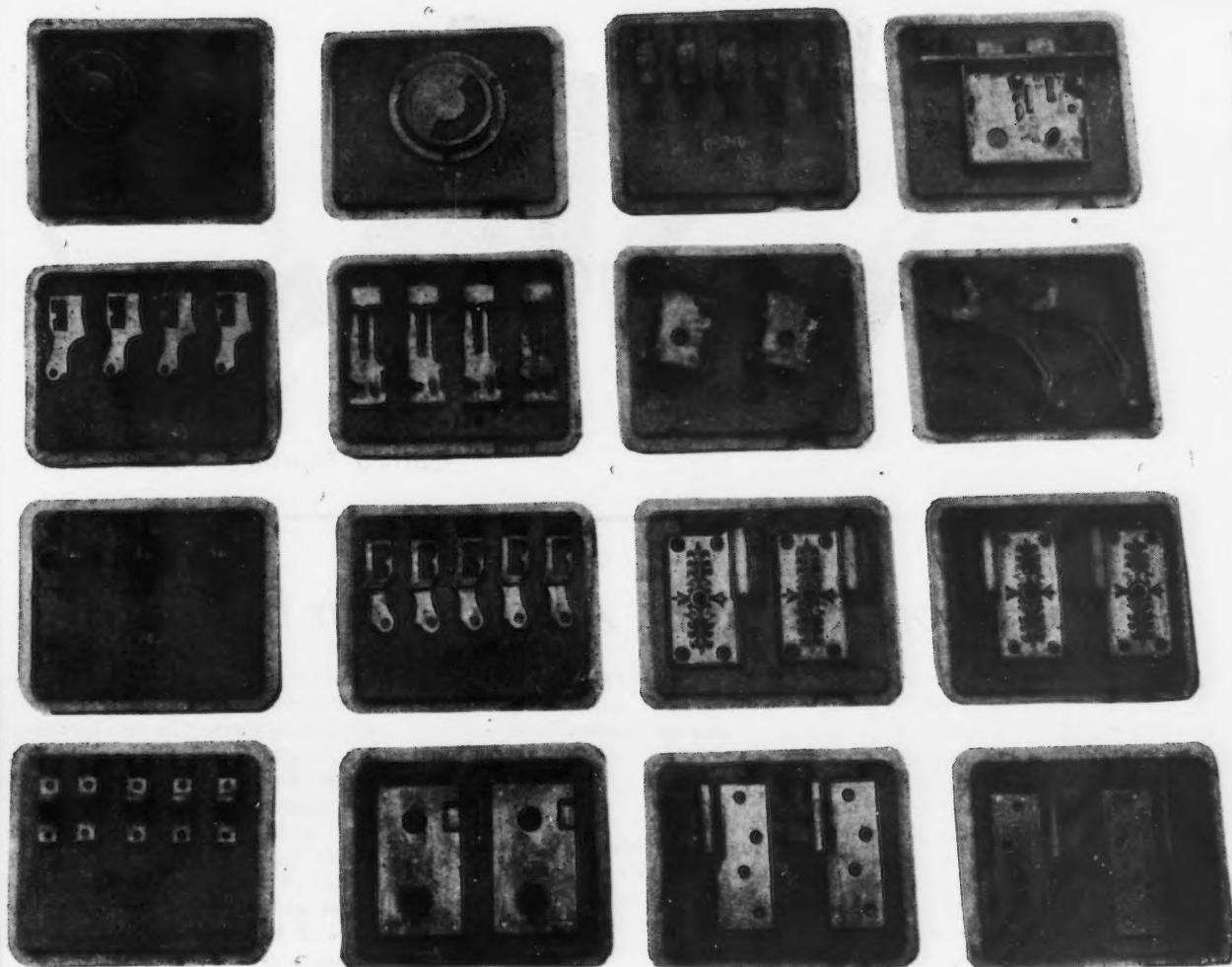


FIG. 5—As regards the preparation of the stone-compound insert plates, the plan is as follows. A stone-compound insert plate is cast following standard procedure with the desired number of individual patterns thereon. These insert plates are cast in the two-part magnesium master frame shown here.

RIGHT

FIG. 8—A metal-pattern maker finishing a small insert. In the background a molder making a mold.

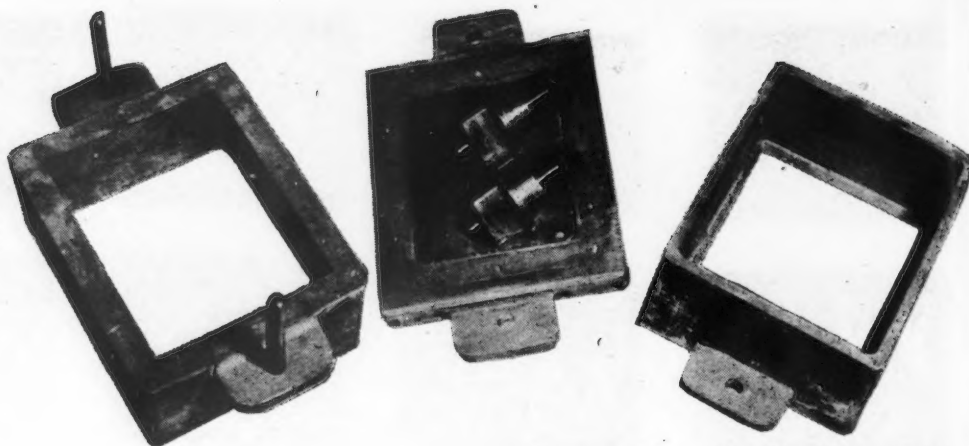


ABOVE

FIG. 7—Typical samples of the type of castings which have been successfully produced by this process. These insert plates are relatively inexpensive to produce and a very considerable quantity of them can be turned out in a short period of time. It is, of course, essential that the master match plate frame be dimensionally accurate and the same accuracy is likewise necessary in all other parts entering into the assembly, as the insert plates must be interchangeable without special fitting.

(Continued on next page)

FIG. 9—A small metal frame made to receive standard inserts for emergency runs.



Casting Short-Run Variable Designs

Corrosion Resistant Anti-Friction Bearings

By H. HABART
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CORROSION resistant metals are being used in increasing quantities for the manufacture of anti-friction bearings. In general, these metals are divided into three classes: Monel alloys, stainless steels and beryllium copper. Of the Monel alloys, the K grade is used for races, rollers and balls, with retainers at times made of either the S or regular grade. Of the stainless steels, the one containing 17 per cent chromium and 1 per cent carbon is generally used, although in some cases, a 12 per cent chromium, 0.3 per cent carbon type is employed. The nominal composition of beryllium-copper is 2 per cent beryllium, 0.25 per cent cobalt and the remainder copper.

The K Monel alloy has the advantages of being adequately resistant to corrosion when submerged in sea water or exposed to numerous corrosive gases. It is also non-magnetic. These properties have resulted in its use in the manufacture of anti-friction bearings for such applications as rudder and other control mechanisms on submarines and assemblies operating with compasses where magnetism is a major factor. A serious disadvantage of K Monel is its low hardness of about Rockwell C-30 as compared to the C-60 of bearings made from conventional steels. Because of this differential in hardness, the load carrying capacity of K Monel is 10 per cent of that of conventional bearing steels. This lack of capacity naturally influences bearing designs and sizes.

The 17 per cent chromium, 1 per cent carbon stainless steel has a major advantage over K Monel in that

it can be hardened to Rockwell C-55 minimum for thin sections and to C-52 minimum for fairly heavy sections. This steel has been found to have satisfactory resistance to atmospheric corrosion and to salt water spray. These properties have led to its use in certain aircraft bearings. The steel is also suitable for use in the presence of many chemicals which rapidly attack such conventional bearing steels as SAE 52100, case hardened SAE 4620 and case hardened SAE 3310 (modified to 4 per cent nickel).

An outstanding feature of this stainless steel is its resistance to tempering at temperatures ranging to 900 deg. F. Use of this property is made in carrying the load of super-charger exhaust valve assemblies on large two cycle engines where the bearings are exposed to corrosive gases and to temperatures ranging from 400 to 530 deg. F.

It is apparent that the 12 per cent chromium 0.3 per cent carbon steel which can only be hardened to approximately C-50 is under greater handicap than the higher alloy steel, although at times, requirements justify its use.

Mo Modified Stainless

A recent addition to the stainless steels is one known as AMS-5630-A, which is a 17 per cent chromium, 1 per cent carbon, 0.5 per cent molybdenum alloy. The addition of molybde-

num provides for obtaining as high as Rockwell C-62 hardness in thin to medium sections. The development of this molybdenum stainless steel has taken this class of alloy out of the low capacity field, giving it equal rank with respect to load carrying ability to the conventional bearing steels. Where magnetism is not a factor and where the corrosion resistance of hardened AMS-5630-A steel is adequate, the alloy should have wide use.

A non-magnetic, corrosion resistant alloy which is entering this field is beryllium copper. This material can be treated to a Rockwell hardness of about C-38 which would indicate it to have better load carrying capacity than K Monel. However, limited tests have shown beryllium copper and K Monel to have approximately equal capacity. A feature of beryllium copper which may have high value is its sparkless quality. This property should enlarge its use in applications involving explosive mixtures. While the initial cost of beryllium copper is greater than K Monel, its better machining properties when soft annealed and the simplicity of its heat treatment, make its final cost comparable.

It is apparent that a non-magnetic, highly hardenable alloy which is suitable for submersion in sea water (or equivalent corrosive media) has not been developed. Neither does such a development seem likely in the near future. For installations with those requisites, choice is limited to K Monel and possibly beryllium copper, making it necessary to provide for their low capacity by design.

By RALPH A. STEARNS

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Managerial Use Of Time Study

IN view of the widespread use of time study as a basis for rate setting, it may be asked to what extent industry as a whole would utilize time study if it were prohibited in some summary fashion from employing time study to set rates for its piece work and incentive systems. This thought was prompted by a recent round table discussion before a group of graduate students when a leading labor representative asserted that in the postwar era organized labor would no longer tolerate the setting of piece rates by time study.

Since the start of the war many moderate sized establishments to whom the time study engineer was formerly a stranger have now made him an integral part of their organization. It is to be admitted that due to a combination of the lack of understanding of many managements and to the scarcity of properly trained time study engineers, many companies permitted their time study engineers to serve as mere rate setters. Where such is and has been the case, it is to be feared that the companies in question have passed over valuable opportunities for cost reduction and attendant job improvement and that the time study engineers in question have lost their chance to become valuable adjuncts to top management.

The purpose of this paper will be to attempt to conduct a brief inquiry into the uses—other than in incentive systems—to which management of any size can put the data secured by its time study engineers. By dwelling primarily upon this phase, the author does not mean to minimize or pass over the essential part played by time study in the construction and operation of incentive systems of all types but, assuming that that particular function is so well known to all students of management, he would prefer to concentrate upon the less frequently emphasized aspect of time study. At this point a definition of time study by one of its leading ex-

... Some basic contributions of time study engineers are set forth that are too often overshadowed by the rate setting function. Amplified uses are suggested of records, tables and observations developed by the time study department.

ponents may serve to show the relative place that men in the field ascribe to rate setting.

Objectives Defined

The aims of time study are "to subject each operation of a given piece of work to a close analysis, in order that every unnecessary operation may be eliminated and in order to determine the quickest and best method of performing each necessary operation; also to standardize equipment, methods, and working conditions; then, and not until then, to determine by scientific measurement the number of standard hours in which an average man can do the job."

It then can be seen that, if as in the hypothesis previously stated, a company with a well-trained time study staff were to find itself restrained from utilizing its rate setting function it might possibly still be able to justify the carrying of the department as an item of overhead. Just how could the department be of service if none of its studies would serve as a basis for wage payment? A number of possibilities may be listed:

1. Through his thorough analysis of the work the time study engineer could make up a standard working procedure which would eliminate in so far as possible unnecessary time, transportation, materials and motions. This could serve as a basis for training new workers on the job. It could be an aid to making the present operator a better one. Through simplification of the procedure it might result in the employment of women or of less skilled workers, effecting savings through a reduction in the break-in period.

2. Standardization of the equipment throughout the plant or plants of the

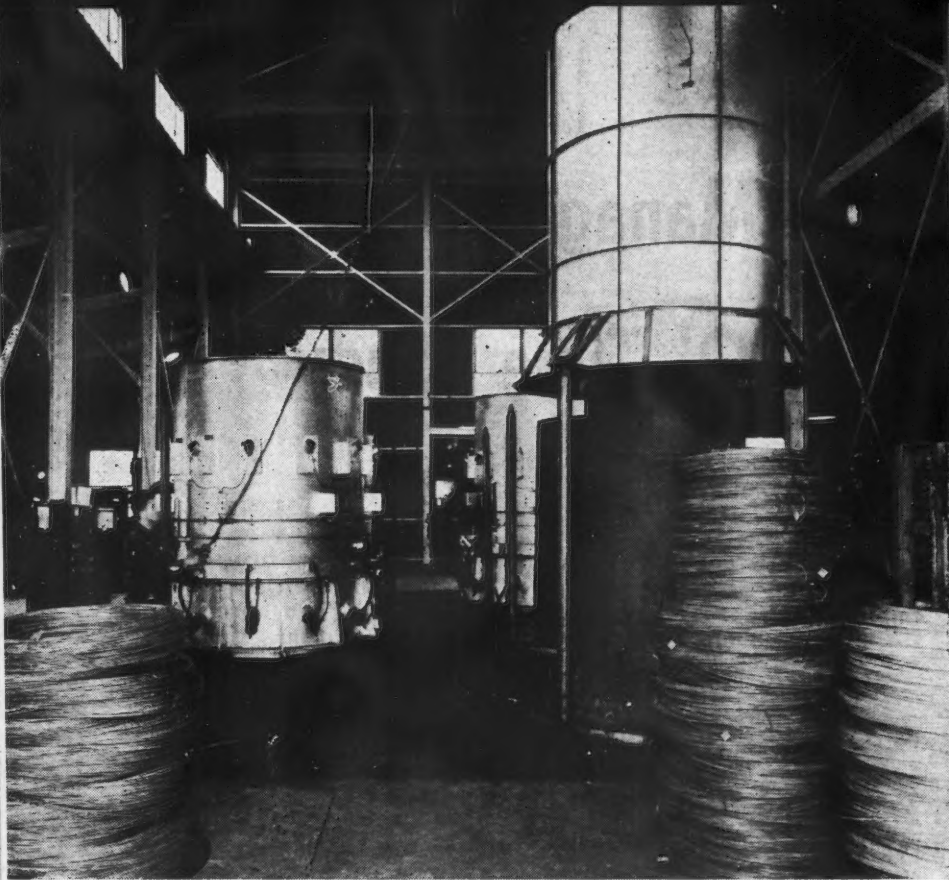
organization and savings in maintenance and repairs could be effected.

3. By reason of the primary time values which the observer has gathered over a period of time, he is able to state with a high degree of accuracy the production per minute, hour or shift, of which each machine and operator is capable. For this reason he can handle the essential activity of scheduling production throughout the plant on each machine so as to secure the minimum possible amount of machine down time and the most efficient routing of work from one station to the next. He can plan the work of the tractor drivers and the crane operators as well as that of the machine operators so that one group will not impede the other's part in continuing production.

4. With the aid of formulas and tables based on observations previously made, the time study analyst is in a position to estimate the direct labor cost of future orders or new products; to forecast the delivery dates on incoming orders, and to keep customers informed during their processing of the probable shipping date. Knowing production as he does, he is a source of suggestions for production short cuts. When production tie-ups occur in one department he can aid in their solution or devise other routes for completing the order.

5. Inasmuch as he is constantly on the floor the time study man can serve as a trouble shooter for management. Having a thorough knowledge of the plant he can make surveys of the operation of any department, which, due to the nature of his training and position, can be counted upon to be objective. Similarly, where particular machines are causing bottlenecks, he is in a favored position, through the

(CONTINUED ON PAGE 146)



Spheroidizing Cycle

ANNEALING department at the National Screw & Mfg. Co., Cleveland. There are six bases and three furnaces which can be independently operated on any one of the six bases. Enough wire and steel rods are annealed daily for the manufacture of 14,000,000 fasteners.

THOUSANDS of manhours, as well as many tons of steel and critically needed fuel, have been saved as a result of intensive tests by the metallurgical department of the National Screw & Mfg. Co., Cleveland, in its effort to determine how its annealing department could be operated most efficiently to meet the metallurgical requirements of annealing material for the cold heading operations on the 14,000,000 fasteners produced daily.

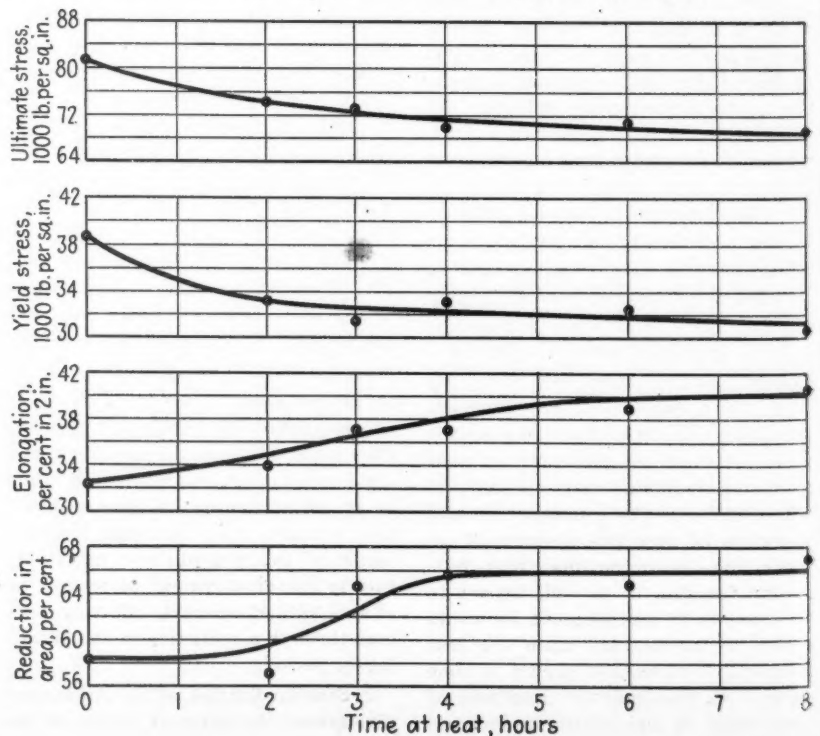
Many series of tests were necessary for predetermining the most efficient spheroidizing cycles for the operation of its annealing furnaces at plant No. 2. Not only has there been a saving in manhours and fuel but excellent uniformity throughout the charge and consistently good results from the annealing equipment have been achieved. From the mass of data, compiled from the 234 charges which were examined, results were condensed for furnace operators into a single page of tabulated instructions to set the total furnace time for the material analysis and charge weight involved in each heat. This information is placed on the charge ticket which accompanies the wire coils, and that is all the information the operator needs to run his particular cycle.

The furnace installation consists of six bases and three furnaces which can be independently operated on any one of the six bases. This equipment was installed to anneal and spheroidize

rods and wire coils ranging in analysis from C 1010 to SAE 2330, NE 8640, A 4037 and other alloy aircraft steels.

The charge to be annealed is con-

FIG. 1—Physical properties vs. time for 0.30 to 0.40 carbon 13/32-in. diameter hot-rolled rods. Heat No. 4203. No. 2 thermocouple at 1200 deg. F.



Cycles Standardized . . .

By H. L. HOPKINS
Plant Metallurgist and
Superintendent Plant No. 2,
National Screw & Mfg. Co., Cleveland

tained on the suitable spider, placed on the bases. A protective inner cover is lowered over the entire charge. The portable furnace is lowered into position and the necessary gas and electrical connections made. The furnace proper is fired through ten burners at the base of the radiant heating tubes.

Then, as in usual practice, each charge is permitted to come up to the proper temperature, soak for the necessary length of time and then the furnace is removed to another base which has been previously prepared. A heavily insulated cooling cover is lowered over the charge as soon as the furnace is removed. This permits the material to cool at a uniform rate from the annealing or spheroidizing temperature. The control and power equipment is so arranged that the hookup of the recording equipment follows the movement of each furnace by means of a num-

... By correlating a series of tests, the proper annealing temperatures for six types of steels have been determined within very narrow temperature ranges. This has resulted in manhour and fuel savings and a consistently higher quality product.

ber of suitable plug-in switches.

The determination of material softness, according to percentage of total spheroidization, is considered to be a difficult point of comparison and involves preparation of samples for microscopic study. The reason for the installation of the equipment was to make the material as soft as possible for the cold heading operations. So it was decided to set up cycles which would produce ultimate tensile stresses for C 1038 steels of 67,000 lb. per sq. in. or lower and a reduction of area of 66 per cent or higher. Results of the study are used as the determining factor in setting up cycles for annealing steel rather than use the grain structure study method.

Exploration of the most efficient cycles for operation of these furnaces meant that, first, the proper temperature had to be determined and second, the proper soaking time had to be selected, that is, the time which the charge was to be held at temperature after all parts of the charge had reached the desired point. This was necessary because uniform spheroidizing depends on uniform temperature application to the charge. Of course, these two factors could be different for all steels of different analyses so the process would have to be applied to all the different steels to be treated. This was done. However, to make the results of the tests as concise as possible, the case of C 1038 steel only is related.

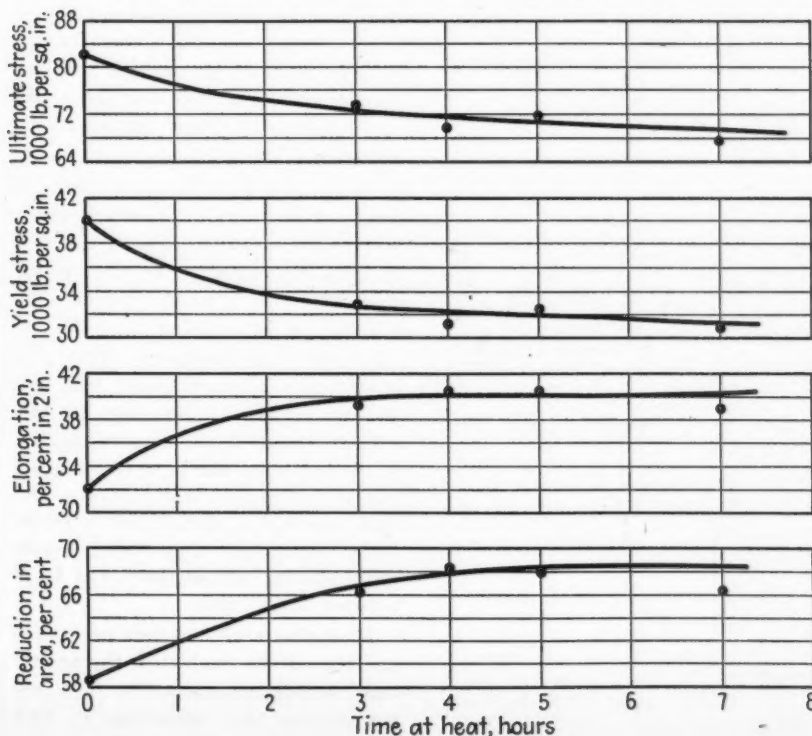
To make the results of any tests truly comparable, all factors entering into the results must be controlled to be as nearly identical as possible. In this case, the factors which had to be controlled were:

- (1) Material analysis
- (2) Rod diameter
- (3) Charge weight
- (4) Thermocouple location
- (5) Method of testing
- (6) Method of comparison of data

To undertake the study on the first three points, the cycle tests were run on rods of the same diameter (13/32 in.) with all coils coming from the same open-hearth heat and the charges were made of the same number of coils to total approximately 4800 lb. The chemical analysis of heat No. 4203, used exclusively for this test, was 0.36 per cent carbon, 0.81 manganese, 0.015 phosphorus, 0.034 sulphur and 0.155 silicon.

The thermocouple location, which was to be used to determine the starting of the soaking time, was between the two bottom coils, halfway through the coil. To make certain that this

FIG 2—Physical properties vs. time for 0.30 to 0.40 carbon 13/32-in. diameter hot-rolled rods. Heat No. 4203. No. 2 thermocouple at 1260 deg. F.



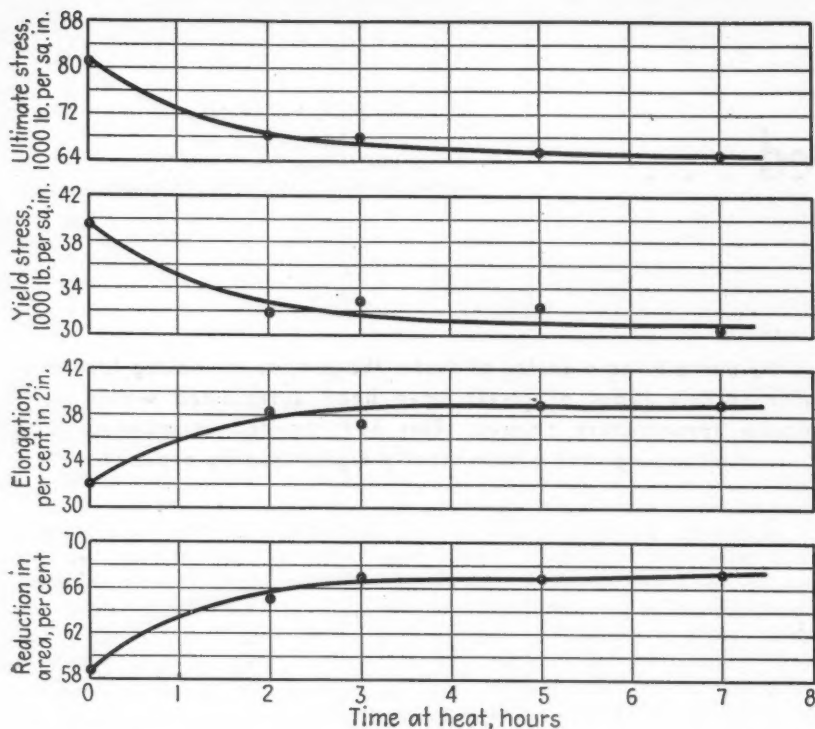


FIG. 3—Physical properties v. time for 0.30 to 0.40 carbon 1 3/32-in. diameter hot-rolled rods. Heat No. 4203. No. 2 thermocouple at 1300 deg. F.

point was located identically for each charge, a special jig was manufactured and placed between the coils as they were loaded on the stripping machine. The jig was, in effect, a short piece of pipe with the hole large enough for the insertion of the thermocouple and with a square flange at the inner end to make sure

the jig could not rotate or slip forward or backward. After the loaded spider was placed on the base, the bottom flexible thermocouple was inserted in the jig. Thus, the temperature point of comparison was kept constantly related to the source of heat.

The testing method decided upon

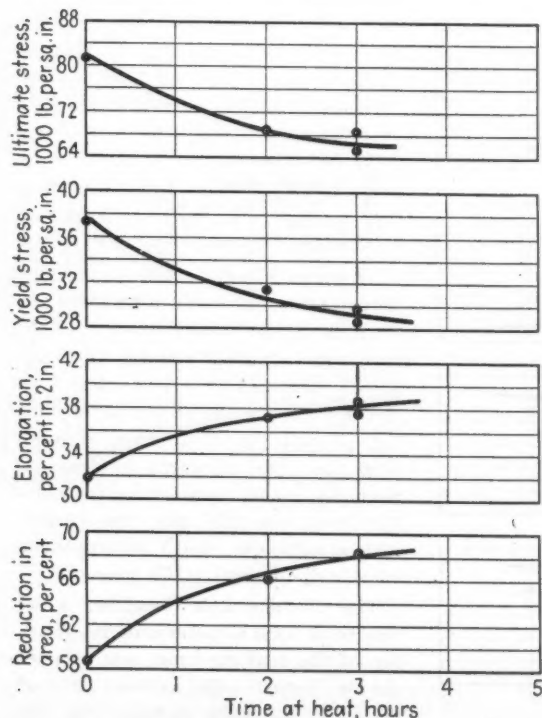


FIG. 4—Physical properties vs. time for 0.30 to 0.40 carbon 1 3/32-in. diameter hot-rolled rods. Heat No. 4203. No. 2 thermocouple at 1320 deg. F.

was to determine the following for each charge, taking an average reading from pieces of rod cut from both ends of the top, middle and bottom coils:

- (1) Ultimate tensile strength in pounds per square inch
- (2) Yield point in pounds per square inch
- (3) Reduction in area in per cent
- (4) Per cent elongation in 2 in.

In order to determine the proper temperature, it was decided to start running the charge at 1200 deg. F. and to progress to 1260 deg. F., 1320 deg. F. and 1400 deg. F. The low-limit temperature was known beforehand to be too low and the high-limit temperature too high. The temperature area was to be explored progressively and by also running the charges at each temperature with soaking times ranging from 1 to 8 hr., the results at each temperature could be adjusted for the most efficient soaking time.

Figs. 1 to 5 illustrate the results of these tests for 1200 deg. F., 1260 deg. F., 1300 deg. F., 1320 deg. F., and 1400 deg. F. Others were run and the area around 1320 deg. F. was explored by running tests at 5-deg. and 10-deg. F. intervals. Of course, all charts show a progressive downward trend in the ultimate stress as the soaking time increased. But, a common property of all tests showed that after 3 hr. of soaking time there was little decrease in the ultimate strength. The conclusion at any rate was that there was no need for continuing the soaking time beyond 3 hr. So it was decided that for C 1038 steel, a 3-hr. soaking time was economically the best and most suitable answer to that phase of the problem.

With this factor standardized, the results from tests at all temperatures were tabulated and graphed in Fig. 6 to show the variation in the physical properties for identical charges held for the same soaking time but at different temperatures. The first tabulation indicated that the temperature around 1300 deg. to 1360 deg. F. should be more carefully explored and this was done to make the curves continuous and correct. This was necessary because all previous tests indicated that the proper spheroidizing temperature was to be between these limits.

After this work had been performed and the curves completed, the answer was immediately apparent. The best temperature for annealing C 1038

steel proved to be 1330 deg. F. By referring to Fig. 6 it can be seen that the curves show how the yield and ultimate move downward as the temperatures increase to a certain point. The curves dip sharply at this point and rise again if carried to a temperature which is obviously above the lower critical point.

It can also be noted from Fig. 6 that the elongation and reduction in area reach the highest point on the curve at 1320 deg. to 1330 deg. F. This ideal combination of physical properties produced material which was most satisfactory from a cold-heading standpoint. In order to have a reasonable margin of safety to accommodate the various heats of steels, it was decided that 1320 deg. F. was the proper spheroidizing temperature.

This test was repeated on several other rod sizes of C 1038 steel, which affected the total weight of the charge. This same plan was followed on the other steel analyses. This did not change the temperature but did allow the soaking time to be varied for two charges, one 4200 lb. or less and the other 4500 lb. or more. All data were tabulated and graphed for each steel analysis and these charts served as standards.

Basically, six different types of steel were used. After completing the study of C 1038 steel, the metallurgical department was able to determine within a very narrow temperature range the proper annealing temperature for the other types of steel. Therefore, it was a reasonably simple matter, requiring far less testing time, to determine the exact annealing temperature for every specific type of steel used in manufacturing fasteners.

Automatic controllers record the temperature of the hottest section of the charge, the coolest section of the charge and the actual furnace temperature. Each operator records and signs on the strip chart the charge number, date, base number, furnace number, type of material, heat number, weight of charge and annealing temperature setting. With this record available, it is possible to check the history of any specific charge of material.

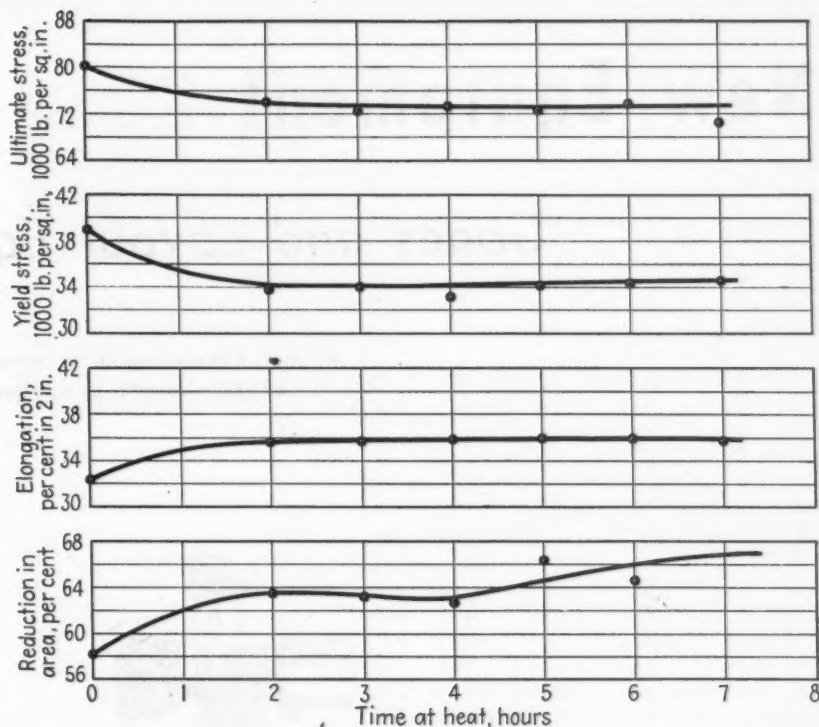
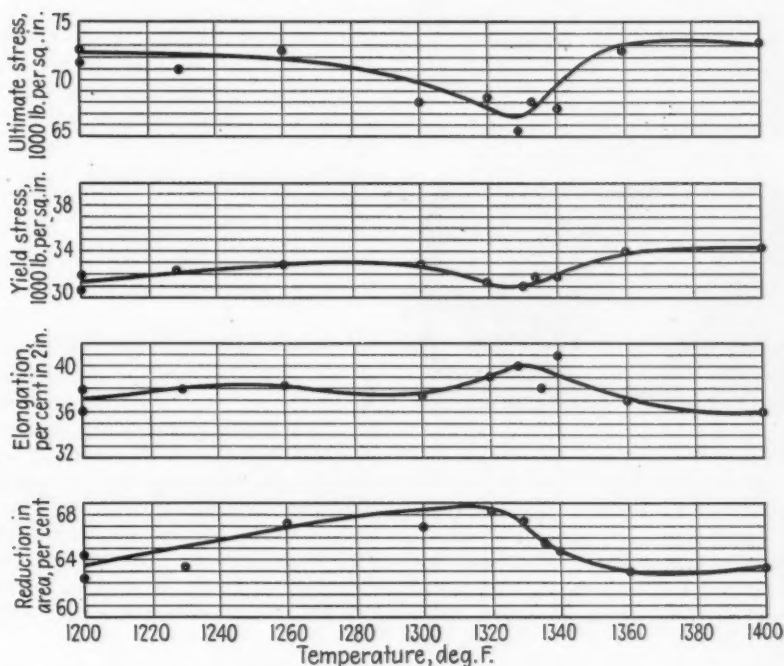


FIG. 5—Physical properties vs. time for 0.30 to 0.40 carbon 1 3/32-in. diameter rods. Heat No. 4203. No. 2 thermocouple at 1400 deg. F.

FIG. 6—Physical properties vs. temperature when No. 2 thermocouple has been at heat for 3 hr. in new annealing equipment.



New Equipment . . .

Gages and Layout Equipment

. . . Recent development in measuring and checking devices and accessories are described in the following pages.

AN unusually high amplification Precisionaire which provides amplification of 20,000 to 25,000 to 1 (a spread of 2 to 2½ in. per 0.0001 in.) on internal measuring and is graduated in 0.000005 in. (5 millionths) has been announced by *Sheffield Corp.*, Dayton. Model 600-0 is suitable for tolerances ranging from 0.002 to 0.000005 in. with amplification from 15,000 to 25,000 depending on the part to be checked. Master gaging rings and spindles are made to an extraordinary degree of accuracy.

Roughness Meter

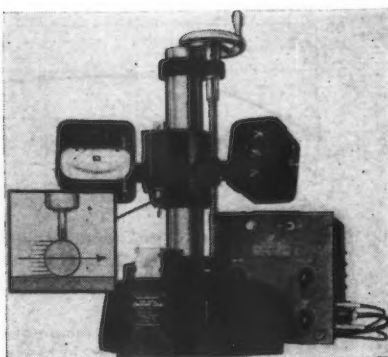
FOR the control of the surface finish of high explosive large caliber shells, a Type CP roughness me-



ter has been announced by *Physicists Research Co.*, Ann Arbor, Mich. The meter provides measurements of average roughness on extremely coarse surfaces such as shells. Readings are in microinches of average roughness of the surface being measured. The meter and scale selector provide full ranges of 300, 1000 and 3000 microinch. The tracer is designed for hand operation and is built for use on rough shell surfaces.

Electronic Gage

AN electronic gage, Model 130, has been developed by *Federal Products Corp.*, Providence 1. Either tolerance lights or the indicator dial



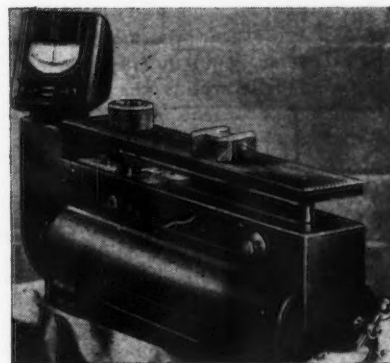
can be used on this Foote-Pierson gage—the lights for fast, 100 per cent inspection, the scale for selective inspection. Contact pressure is adjustable from 2 to 16 oz. Four magnifications enable reading from 10 microinch to 0.003 in. Variations in the position of the mechanical contact point, are magnified accurately by means of the electronic circuit.

Master Set of Gage Blocks

CAPABLE of producing any combination of sizes required in precision measurement, a complete set of gage blocks, DoALL gage set No. 118, has been announced by *Continental Machines Inc.*, Minneapolis 4, Minn. The master series not only provides for more duplicate combinations of the same size but is said to make possible the widest range of com-



bination of any gage set on the market. It contains the so-called thin blocks that range in size from 0.010 to 0.090 in. The series is also well represented by standard gage sizes, by fractional size gages and by standard gage block sets provided in steps having a minimum increment of 0.0001 in. Special gage blocks called wear blocks protect the regular gages when they are used under conditions which might cause excessive wear. Every gage is etched with its individual size clearly and legibly marked and is of uniform depth. In addition to the size marking, each gage is individually etched with its own serial number.



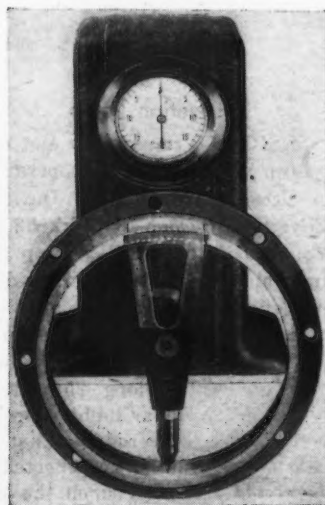
Internal Measuring Instrument

AN internal measuring instrument of the comparator type, Model N-5, has been announced by *Sheffield Corp.*, Dayton, Ohio. It is equipped with an electric gaging head known as the Electrigan. Electrical magnification causes instantaneous action of the indicator thus giving a quick positive reading. The stylus is said to have a feather touch so that gaging pressure need never exceed 3 oz. A fine adjustment knob is used in obtaining a zero setting. An automatic stabilizer

prevents ordinary voltage variations from affecting accuracy of the readings. The gage is normally used at the bench in receiving inspection, the toolroom or gage laboratory for checking master and working ring gages, setting snap and length gages and other high precision work having one or more internal dimensions. Precision blocks or masters are used as a reference in setting up the instrument. A limit switch arrangement operating two red signal lights assists the operator in making the setup and in properly positioning the work for checking.

Hole Checker

FOR gaging the inside diameter of a large bearing housing to very close tolerances, a hole checker has been announced by *American Gauge*



Co., 158 Bayard Street, Dayton 1. A special sizing plug has been developed with the upper part of the plug finished to the exact radius of the inside of the bearing housing. The lower part carries the gaging head, which is calibrated for high and low limits of accuracy. The contact point is of Norbide which is wear resisting. The unit is air-operated and is set with high and low limit master ring gages. Tolerance is 0.0005 in.

Multiple Gaging Instrument

A MULTIPLE electric precision gaging instrument built for the checking of 21 outside diameters of a master camshaft has been announced by *Sheffield Corp.*, Dayton, Ohio. Each of the dimensions is indicated on the diagram panel by means of light signals and all are



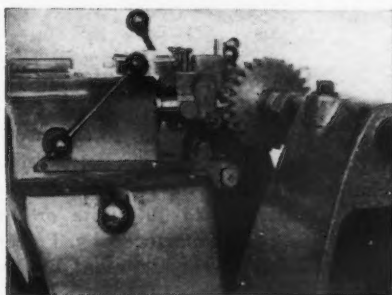
checked simultaneously in one quick operation. In this application, thirteen dimensions have tolerances of 0.005 in., six have 0.010 in. and two have 0.001 in. Each of the 21 gage heads actuates a set of two individual signal lamps mounted behind a common port. Lights remain off when the dimension is within tolerance limits. A red light signifies the dimension is under the minimum tolerance limit while a green light signifies the dimension is over the maximum.

Thread and Plug Gage

AN improved thread and plug gage has been announced by *Republic Gage Co.*, 2228 Fenkell Avenue, Detroit 21. The V-nides derive their long-wearing qualities from an extremely hard case (Rockwell C73-75), the result of a specially developed heat-treating process. Other V-nide qualities include the same coefficient of expansion as steel, availability in "W" tolerances, extreme hardness with tough core and the same feel as tool steel gages.

Gear Checker

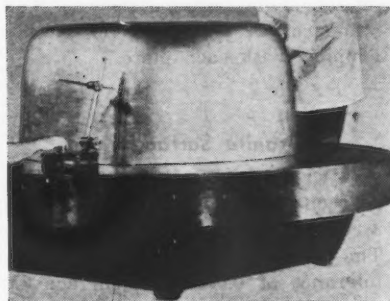
AN instrument for checking cone, tooth spacing and taper tooth has been announced by *Fellows Gear Shaper Co.*, Springfield, Vt. The instrument can be converted quickly from the checking of cone measurement to the checking of tooth spacing, illustrated, as well as the checking of the taper of the tooth which is



used in connection with the production of extremely accurate gears where full face contact is necessary. The instrument is provided with an automatic indexing device which rotates the gear tooth-by-tooth as the operating lever is returned after making a check and has a capacity for gears up to 12 in. pitch diameter.

Stellite Gage

AN increase in the standard sizes of Stellite thread plug gages from No. 6 to 15 in. in diameter has been announced by *Cadillac Gage Co.*, Detroit. Special pitch diameters are available according to the customers' specifications. It is claimed that stellite has a lower coefficient of friction than steel, is acid-proof and corrosion proof and is non-magnetic.



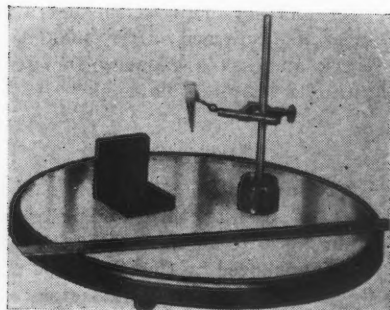
Layout Plate

FOR the transfer of information from blueprint or loft to master model, pattern, jig or fixture, a radial layout plate illustrated above, has been announced by *Contour Co.*, 43 East Green Street, Pasadena 1, Cal. The plate makes available a flat working surface in any of the three dimensions. The surfaces intersect each other at 90 deg. Through the use of specially designed protractors, a flat vertical surface is automatically held on the radius line throughout the entire 360 deg. The plates are furnished in two sizes, 24 and 69 in. Other sizes are custom built. All plates are normalized and the 24 in. plate is hand scraped while the 96 in. plate can be furnished hand scraped. In addition to the top surface, outer edge and supporting points, the lower edge is also machined for clamping purposes.

Glass Surface Plate

A GLASS surface plate of ungaging instrument built for the developed by *Main Electric Co., Inc.*, Rochester, N. Y. The natural quali-

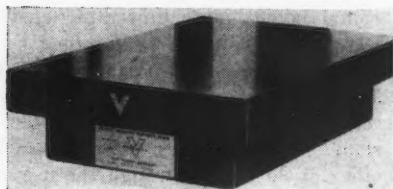
ties of glass are said to make it ideal for surface plate use. The plate is guaranteed flat within 0.0001 in. and its smooth surface allows tools to



glide easily without sticking or chattering. The plate is temperature resistant, corrosion proof and non-magnetic. It is 16 in. in diameter disk of heavy glass housed in a metal standard. A protective felt cover is supplied with each plate.

Granite Surface Plate

SURFACE plates of granite have been announced by *State Mfg. & Construction Co.*, Franklin, Ohio. The plates are lapped in series to a tolerance of 0.00005 in. surface flatness. This flatness is not changed by shock or temperature fluctuation. The material is harder than tool steel and consequently cannot be scratched by

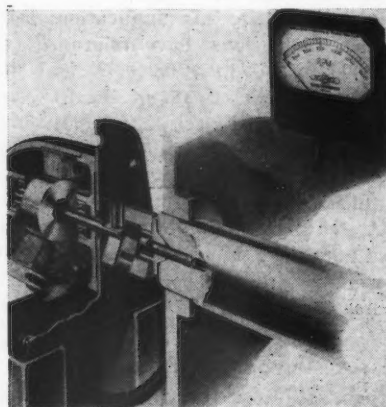


instruments. Even if the surface is nicked by a heavy blow, the base of the instrument would surmount the nick without affecting the precision of measurements. Because it is obtainable in great blocks, surface plates can be fabricated from it in the largest practicable dimensions.

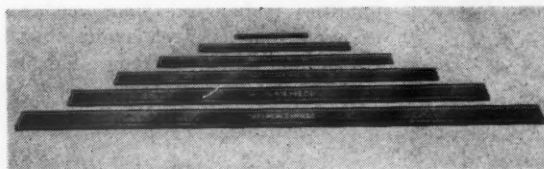
Speed Indicator

AN electric speed indicator which gives accurate readings of speeds from 100 to 5000 r.p.m. has been announced by *Reliance Electric & Engineering Co.*, Cleveland. The pick-

up unit, a miniature six-pole alternator with a permanent magnet rotor, is mounted on the shaft whose speed is to be measured. The indicator, a permanent magnet, moving coil type, meters the pick-up output on a 3 3/4 in. scale which cover 95 deg. of arc. The resistance of the indicator is sufficiently high so that the size or length of leads connecting the units will have no effect on accuracy. The indicator is not affected by other magnetic material and there is no loss of accuracy because of length of service.



Indicators are provided for full scale deflection corresponding to 1500, 2000, 2500, 3000 and 5000 r.p.m.



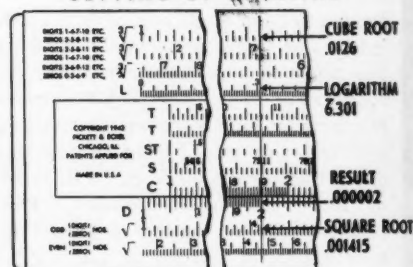
Straight Edges

ALINE of steel straight edges has been announced by *Taft-Peirce Mfg. Co.*, Woonsocket, R. I. The six sizes range from 12 to 72 in. The edges are of suitable proportions, hardened, drawn and accurately ground straight and parallel.

Decimal Point Locator

ASLIDE rule decimal point locator and a slide rule for determining the decimal point mechanically in involved expressions with results up to 19 digits or 19 zeros has been announced by *Picket & Eckel*, 53 West Jackson Boule-

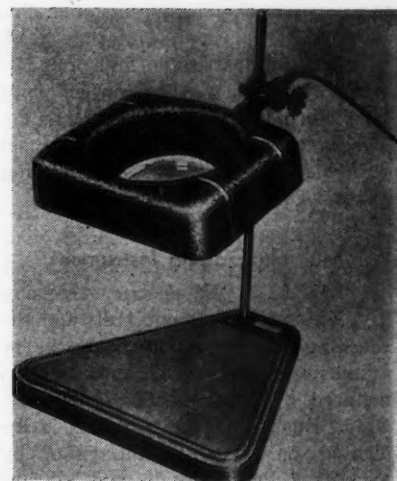
FOUR READINGS WITH ONE SETTING OF HAIRLINE



vard, Chicago 4. A 30 in. scale accuracy for cube root, a 20 in. scale accuracy for square root on a rule with 10 in. scales are obtainable. With one setting of the hairline, the number of digits or zeros in the result, square root and cube root can be read. The locator and slide rule is 11 in. long, 2 in. wide, 1/4 in. thick. It is constructed of Sorex tag lithographed, varnished and bonded.

Inspection Lamp

DESIGNED to simplify and speed up visual inspection operations, the *George Scherr Co., Inc.*, 200 Lafayette Street, New York 12, has announced its Magni-Ray lamp. The lamp which has a lens 5 in. in diameter is encased in an aluminum alloyed casting. Each lamp is equipped with two 4 in. long 25 watt tubular bulbs especially silvered so that the light is reflected directly upon the work without any loss of power. The inspection lamp is illustrated below.



HARDINGE

ELMIRA, N. Y.

Matched machines for high speed performance

These matched high speed precision machines have a place in your planning . . . present and future . . . because you are always interested in higher speeds, extreme lasting accuracy and simplicity and ease of operation. Complete specifications and typical price quotations upon request. Ask for complete bulletins."

HARDINGE BROTHERS, INC.
ELMIRA, N. Y.

SPECIFICATIONS

High Speed Precision Lathe: 1" collet capacity, 9" swing, 17" center distance, eight spindle speeds up to 4000 R.P.M.

High Speed Precision Toolroom Lathe: 1" collet capacity, 9" swing, 16" center distance, sixteen spindle speeds from 27 to 1750 R.P.M.

High Speed Precision Second Operation Machine: 1" collet capacity, 6" step chuck capacity, 5" jaw chuck capacity, 9" swing, eight spindle speeds up to 4000 R.P.M.

High Speed Precision Milling Machine: 1" collet capacity, 14" longitudinal, 13 1/4" vertical, 5 1/2" transverse travel, eight speeds from 110 to 1850 R.P.M. TM model for plain milling, UM model for spiral milling.

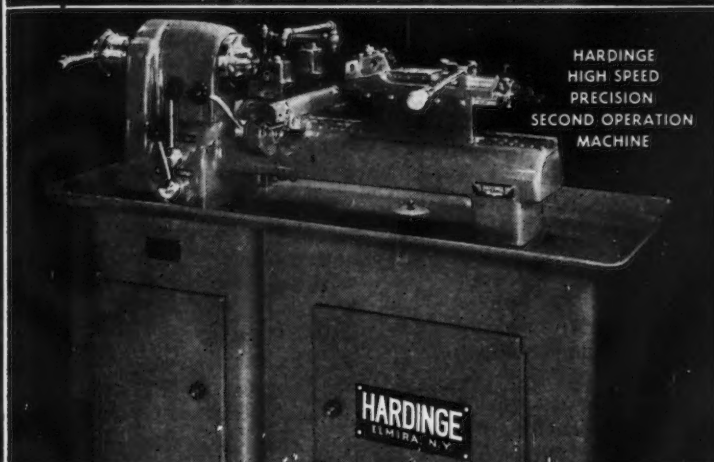
*All machines illustrated have the
Hardinge Precision Preloaded
Ball Bearing Spindle Construction*

**"Performance has established
leadership for HARDINGE"**

THE IRON AGE, April 19, 1945—79



HARDINGE
HIGH SPEED
PRECISION
LATHE



HARDINGE
HIGH SPEED
PRECISION
SECOND OPERATION
MACHINE



HARDINGE
HIGH SPEED
PRECISION
TOOL ROOM
LATHE



HARDINGE
HIGH SPEED
PRECISION
MILLING
MACHINE

Assembly Line . . .

STANLEY H. BRAMS

• **Reconversion comes alive at Detroit, where a race has begun to beat go-day with completed plans for a resumption of car output . . . Active progress is being made.**



DETROIT—The news from the automobile world this week is that reconversion has positively and actively begun. The markers for the path leading to a resumption of passenger car output sometime after VE-Day were laid in place at the WPB-industry meeting of a fortnight ago (*THE IRON AGE*, April 12, 1945, p. 80), and now the leveling of the approach is underway in earnest.

Machine tools, tooling, deferments for essential make-ready employees and the physical and paperwork mechanics of changeover have been much under scrutiny in Detroit since the contingent led by WPB Chairman J. A. Krug left the city. The WPB offices are a beehive of activity, reminiscent of the early days of war production. The facilities of the Automotive Council for War Production, clearing house for industry problems, are running full blast. Purchasing offices are busy. In the sales departments of the passenger car companies, the talk is of 1946 models which are confidently expected to be coming off the lines late this year.

As the dispatches from Washington told last week, the automotive industry has been given a clearance for around \$50,000,000 in machine tools, machinery and facilities. Actually, a small share of this—perhaps 10 per cent or so—is non-automotive; technically all civilian reconversion requirements will be treated alike. Machine tools represent about half of the balance. By the time production is au-

thorized, probably soon after VE-Day, the quantity of tools and the dollar value involved will likely scale down further, inasmuch as Mr. Krug's appointee to coordinate auto reconversion, Henry E. Nelson, has already found on his plant trips that initial quantities can usually be cut down a bit under sharp scrutiny.

The final lists of required machine tools went back to Washington last weekend with Mr. Nelson, and they will shortly go out as orders, stapled with a quasi-priority of apparently the same status as indicated here last week.

FURTHER on machine tools, a meeting was to be held here early in the week at which was to be threshed out another phase of the problem—the release of government-employed equipment belonging to private contractors which can be replaced by machines in government surpluses. There are probably a few thousand cases where an automotive company has leased a piece of equipment to one of the services or the Defense Plant Corp. and today has no control over it, while an identical piece of machinery lies idle in a government warehouse. The mechanics of effecting exchanges in circumstances of this sort were to be worked out.

At this same meeting were to be discussed plans of speeding up private leasing or purchase of government machines. Completely clarified procedures have been set up for such transactions, but automotive sources report they find roadblocks along the way which have so interfered with completion of deals that few actual sales or leases have taken place.

As machine tool orders go forward, so will tooling orders. Probably about \$20,000,000 or so in machine tools will be sought, and with them around \$10,000,000 or more in tooling. Some of this work has already begun to appear in Detroit tool shops, as well as an indeterminate amount of die work.

The Detroit tool companies have individual backlogs, practically all military work, ranging from one to three months today. A good share of this can be expected to be cut off when victory comes in Europe, so there is no great worry over the availability of facilities to handle the oncoming automotive retooling. Tool men figure three or four months will be sufficient

Nelles Resigns at Ford Detroit

• • • Claude Nelles, co-director of purchasing at Ford Motor Co. for almost two years, has resigned. A veteran of about 30 years in the Ford organization, he handed in his resignation with the explanation that his health required a long rest.

The move by Mr. Nelles left vacant the general supervision of purchasing in most categories except machine tools, and the company management was not immediately able to make a choice of a successor.

to clean up all automotive retooling programs.

These same people, however, express real concern over manpower problems. Through their Automotive Tool & Die Manufacturers Association they met last week with E. L. Cushman state director of the War Manpower Commission to outline their problems, particularly as they relate to the draft. They pointed out that they have been stripped to bedrock levels by previous draft calls, and that unless they get considerable relaxation on current drafting of the few hundred below-30 men left on the payrolls, both the war program and reconversion may be seriously affected. Indicative of the trend of thinking in Detroit kindled by the Krug meeting, Mr. Cushman promised to take up the matter immediately with state selective headquarters.

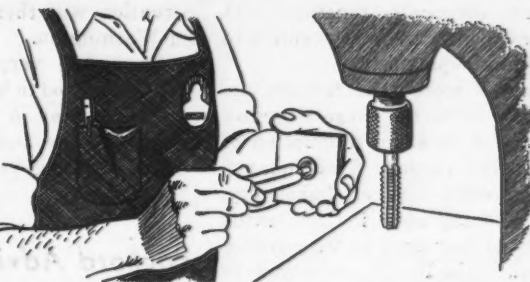
Meanwhile, both machine tool companies and tool and die shops are finding certification of 24- to 29-year-olds relaxing considerably at WPB, another indicated result of the reconversion-slanted thinking of Mr. Krug and his top people. Where only about 15 per cent were being certified by WPB, the practical minimum has now climbed to double that proportion in most cases. Where only a small number of men are involved, some shops are obtaining certifications for all of them. Others are getting 50 per cent or more certified.

THE quick steps Mr. Nelson took last week toward solution of machine tool problems promptly turned automotive attention toward another potential bottleneck, materials. A

NOTHING WRONG WITH "REJECTED" PARTS? "GREENFIELD MAN" SOLVES GAGING MYSTERY

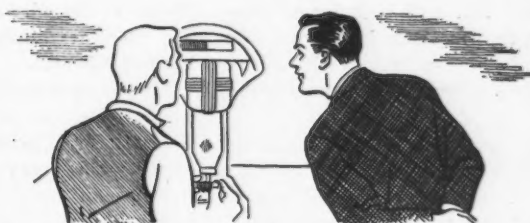
[A GVD SHOW-HOW REPORT]

1 Customer ordered six 1/2-20 "Go" plug thread gages made to "X" pitch diameter tolerances. Three of them were assigned to machine operators as working gages and three to inspection department for final inspection.



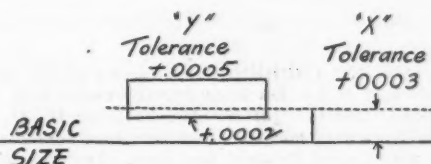
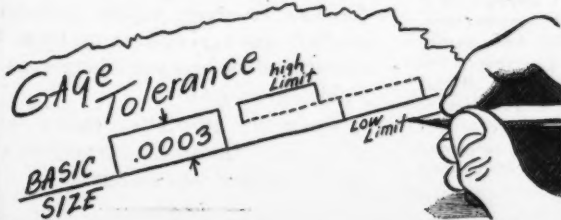
2 At tapping job the machine operators used working gages to check each part before they went on to next operation.

3 But at the final inspection of part, a large proportion of pieces failed to pass "Go" plug gage. Why? Actual measurement of rejected parts showed them to be "OK". Something was wrong. A hurry call was put in for "Greenfield Man".



4 On arrival at plant, "Greenfield Man" first had all six gages measured in customer's own inspection department, and found them all within tolerance.

5 "I'll show you what happened," said "The Greenfield Man". "Although all six gages were within specified limits, some were on the 'high side' and some on 'low side'. Thus high limit gages failed to enter where low limit gages would."



6 He then showed how this problem could be remedied by: 1. Measuring all gages and distributing those that tended to the "high limit" to machine operators and those tending to the "low limit" to the inspection department. 2. By ordering "Y" tolerance for working gages, and "X" tolerance for inspection gages.

Results:

(1) Customer learned that trouble was not with gages he ordered, but with their application to the job. (2) Was able to establish proper gage ordering and handling procedures.

"Greenfield" SHOW-HOW is KNOW-HOW in action!
ON THREADING PROBLEMS SIMPLY CALL YOUR "GREENFIELD MAN" THROUGH YOUR "GREENFIELD" DISTRIBUTOR!



GREENFIELD TAP AND DIE CORPORATION
GREENFIELD - MASSACHUSETTS

meeting on this subject was scheduled for midweek. At that time the automotive people were to be given fairly detailed pictures of the situations on textiles, lead, tin, rubber, lumber, and some few chemicals, together with steel, these being the worry centers of the planning departments.

Indications were that textiles appear today to be the largest barrier in the way of an early resumption of passenger car output. Great quantities are needed for car upholstery. One brightening spot in the textile gloom is the fact that as we advance northward in the Pacific, we move into more temperate climates which reduce dry rot and fungoid deterioration of tents and uniforms, cutting down currently awesome replacement requirements. Thereafter, lead for batteries probably will be the prime problem in auto output, for Navy battery requirements will still bulk large after full scale fighting ends in Europe, and there will be continuing, if not as large, needs from the air and ground forces.

As for steel, the general belief is that enough will be available to produce cars in their rather small initial quantities, and that supply will swell in line with increasing productive facility at the auto plants. As for rubber, enough synthetic is expected to be ready by fall to relieve today's tire problems.

Having been told these probable situations, the auto men will then be asked by WPB to supply month-by-month lists of their materials needs from go-day onward, and the entire situation will thereafter be reviewed in Washington.

Meanwhile very quiet conferences are understood to have been proceeding in the capital in past days between service people and automotive executives, outlining exactly what is seen

now in the way of cutbacks, and what plants can thereby be cleared of military loads. As this information comes back to the plants it is being translated into active redetermination of settlement of the contracts involved and into attempts to transfer remaining jobs to other contractors, thus leading toward early clearance of facilities which the auto industry will need to build passenger cars once more.

Packard Advising Foremen of Ideas On Unionization

Detroit

• • • Packard Motor Car Co., like General Motors, has advised its foremen that a material change in their status at the plant will probably follow their organizing into a collective bargaining unit.

Should unionization of foremen occur, a letter to the supervisors from George T. Christopher, president, stated, "they may well become what the majority opinion of the National Labor Relations Board called them, namely, 'traffic cops'." The letter went on to say: "Candidates for higher management would then be selected and trained for their positions from the start, not promoted from the

ranks. Lower supervision would then function in the capacity of routine leaders carrying out instructions, thus shutting off the opportunities for promotion that have in the past been open to those with ambition and ability."

Mr. Christopher's letter, which said at the outset that the company recognizes the legal right of any employee to join any union he wishes to join, questioned the ability of the Foreman's Association of America to remain an independent union. The letter pointed out that originally the AFL United Automobile Workers Union organized in the plant was taken over by the UAW-CIO, and that the draftsmen and tool engineers, originally organized independently, were also taken over the UAW-CIO.

"The same can happen to the Foreman's Association of America," the letter stated. Remarks made by Lee Pressman, general counsel of the CIO, were introduced to establish the point that Mr. Pressman's organization believes independent unions of foremen in shops where production workers are represented by large international unions are "dangerous to stable labor relations."

Along with this letter went a booklet, titled, "Questions every foreman should answer for himself."

PACKARD'S TOP ENGINEERS: Consolidation of the engineering department at Packard Motor Car Co. has been effected under J. G. Vincent, vice-president of engineering. Left to right are Mr. Vincent; W. H. Graves, present Rolls-Royce quality control manager, who has been named executive engineer; Arthur Nutt who joined Packard last year, appointed director of aircraft engineering; C. R. Paton, chief engineer, now in charge of automotive engineering; and Marsden Ware, chief engineer of the Marine Division, who has been named director of marine and industrial engineering. F. R. McFarland, research engineer on aircraft engines, will head the engineering research division. It was also announced by Packard that G. H. Brodie, present manager of the Marine Engine Division, has been appointed assistant to the president in charge of special design projects, coordinating efforts of engineering, manufacturing sales and management in special engine programs preliminary to the start of volume production on them.

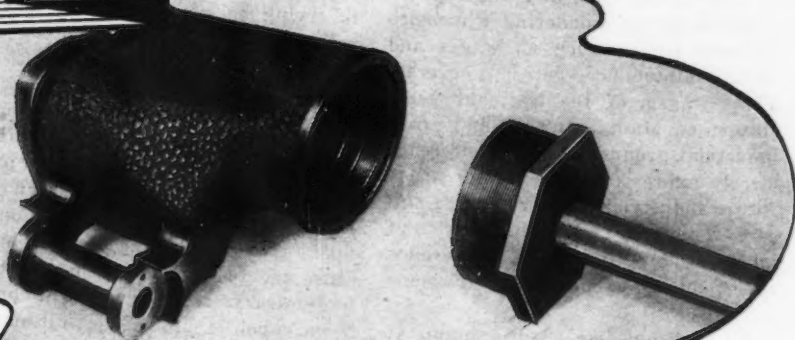


Fire Wrecks Plant, Buildings Syracuse, N. Y.

• • • The entire foundry, machine shop and general office buildings of the E. C. Stearns & Co., Syracuse, N. Y., were gutted by fire recently. The company immediately announced that, "It is our intention to resume operation as quickly as possible, at which time the trade will be notified." The company manufactures, in peacetime, hardware, power lawn mowers, incinerators and automotive lines, and operates a grey iron casting foundry.

LIFE OF ONE STEEL THREAD PLUG GAGE ONE 8 HOUR SHIFT

LIFE OF ONE LINCOLN PARK CARBOLOY THREAD PLUG GAGE 1½ YEARS PLUS!



"At the time these gages were bought, our steel gages were wearing between .001" and .002" in an 8-hour shift, meaning the job was shut down until a gage up to size was put on the job.

"The material these gages were used on was aluminum die casting with 13% silicon content.

"One of the Carboloy gages was put on the job 8-14-42, and wasn't turned to the back side until 10-18-43, having .0007" wear on it. This job was discontinued 3-1-44 and the gage read .0002" undersize.

"Although the gage was chipped, it still didn't interfere with the gage in checking the parts.

"From gage inspection, production and interchangeability of parts, we have had but minor troubles since we put Carboloy gages on all of our threading jobs."

Reported by

**NASH-KELVINATOR
CORPORATION**

COLUMBUS • OHIO

To anyone familiar with gage costs, the tremendous increase in gage life through the use of Lincoln Park Carboloy gages certainly indicates exceptional economies.

But consider the example cited here . . . the inspection of binocular bodies . . . expensive parts produced to exacting specifications. Rejections of these parts, due to inaccurate inspection with steel gages made to include the customary allowances for wear, could show considerable loss of production time and money. Because Lincoln Park Carboloy gages—that showed wear of only .0007" in over a year—could be specified extremely close to required limits, unvarying accuracy in inspection was assured throughout the entire long life of the gages.

In specifying gages for volume inspection, consider *first* those that don't reject acceptable parts . . . and that have a useful inspection life at least fifty times that ever expected of ordinary gages. Consider *first* Lincoln Park Carboloy gages.



LINCOLN PARK INDUSTRIES, INC.

Successor to The Lincoln Park Tool and Gage Company and Carbur, Inc.

1729 FERRIS AVENUE • LINCOLN PARK 25, MICHIGAN

• **WMC reducing employment ceilings in less essential plants . . . Government showing no interest in industrial peace charter . . . Annual wage study stalled.**



WASHINGTON—With a national service act apparently knocked out permanently by the Senate, a race has been started between WMC action in imposing employment ceilings on less essential industries to provide more manpower for war industries, and VE-Day terminations by procurement agencies which will have the effect of creating unemployment.

It is reported that with WPB assistance, WMC is planning a system of recruitment from maritime yards where merchant ship contracts are running out to get the better workers for other industries needing men. This will require pushing back completion dates for ships in most West Coast shipyards to release about 65,000 men now needed in eastern production centers for other types of war manufacturing.

If VE-Day comes fairly soon, it may be that the plan WMC has for imposing ceilings on individual employers, and withdrawing workers to be laid off by listing their names and skills with local USES offices, may be stopped before it barely gets into operation by the volume of cutbacks. Thus a national labor shortage may turn into a labor surplus with government efforts turning to jobs for men instead of men for jobs.

* * *

On the heels of all VE-Day plans, is the shadow of the threatened showdown between industry and labor over continuation of the administration's two-war labor policy. Sore spots are expected to be a continuation of WLB's orders for the closed shop,

the check-off, and labor's demand for the same rate of pay for a 40 hr. week as it is now receiving for a 48 hr. week.

The public is now digesting the results of the United States Chamber of Commerce, CIO and AFL peace conference, and wondering why more concrete points, such as wages and union maintenance, were not covered. The criticism of the National Association of Manufacturers, and other industrial groups that the conference merely expressed pious wishes about future industrial peace vied with sincere hopes by other industry and labor groups that the conference really might be productive of some good.

Sticking out like a sore thumb at this moment is the lack of any government comment upon the conference, and even more, any serious thought being given to the subject by any government agency connected with labor and industry. It is debatable whether government should stick its nose into the situation, if management and labor can get together and not only carry out the U. S. Chamber promises, but devise a system of arbitration with agreed-upon policies to settle in the factories the most troublesome questions.

On the other hand, if industry and labor do go into a pitched fight as soon as the go sign is given for re-

conversion, then perhaps Congress will have to step in and lay down a postwar policy for both labor and management to follow. The possible losses to the entire country through protracted warfare between industry and organized labor, when the country is trying to get readjusted to normalcy, cannot be overestimated.

* * *

The whole question of whether the federal government will have to inject itself into the industrial relations picture depends upon how the principals conduct themselves when the urgencies of two wars are no longer upon them. Labor leaders seem to sense the temper of the people, that unnecessary belligerence will bring down upon their heads ultimately dreaded government regulations. On the other hand, the things that management has had to swallow during the war, in the name of emergency, will not justify a strike against the public good in the form of lockouts.

There is little doubt that neither Congress nor the President has power to compel an individual or a company to enter into a closed shop agreement, to abide by featherbed rules, or to submit to increased control over management by labor unions, under the Constitution in time of peace. But if a labor-management fight is long drawn out to the detriment of the whole country, while these questions

JAPANESE WRECKAGE—*Wracked and gutted by U. S. Navy gunfire, this high speed Jap transport settles in the sands on the beach at Iwo Jima with its bow broken and its hull shell pierced.*



GETS TO THE POINT

AND KEEPS IT...DRILLING



SUNOCO EMULSIFYING CUTTING OIL

helps drills cut free and clean...prolongs drill life

Drills that hold their edges cut clean, cut fast, cut accurately and keep production moving. That's why leading metal working plants use Sunoco Emulsifying Cutting Oil to keep drills pointed for production.

Long drill life is what makes such manufacturers as the American Tool Works Company choose, use and recommend Sunoco Emulsifying Cutting Oil. In the photo above is an American 5'-15" Column Hole Wizard Radial Drill. A 3½" hole is being drilled in SAE 1020 cast steel at a speed of 83 RPM and a feed of .018".

Outstanding cooling and lubrication properties of the mixture of 1 part Sunoco and 20

parts water effectively protects the point of the drill. The drill clears easily, does not clog, chatter or burn. Drills last longer and the work is accurately finished with a fine surface.

Whatever the operation . . . drilling, reaming, boring, turning or milling, Sunoco Emulsifying Cutting Oil can help speed production in your plant. Get the details on how others have benefited with Sunoco. Write for your free copy of "Cutting and Grinding Facts" to . . .

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SUN INDUSTRIAL PRODUCTS

OILS FOR AMERICAN INDUSTRY

are being settled by the courts, then there will be a great deal of regulation of industrial relations.

STUDIES on the guaranteed annual wage question by the advisory committee to War Mobilizer Vinson are moving slowly. So far, a research director has not been found, and the studies have not even started, although the late President Roosevelt directed its beginning several weeks ago.

Judge Vinson will consider the shutting off of the draft of all but 18-year-olds soon. If he decides to do this, it will be contrary to the wishes of General George Marshall, Chief of Staff, it is reported.

General Marshall is said to favor giving the men who have had many months of front-line duty a rest, according to reports trickling down to WMC officials. New draftees would be replacements.

The arguments for stopping the big draft of men holding industrial deferments under 30 is that no one expects the European war to last through the eight months it would take to train them, and once trained they would only be useful for guard duty which could be done by men now in limited service classifications, manpower officials say.

Confirming General Marshall's alleged view, was the announcement by Secretary of War Stimson on April 10 that all men now on duty in this country will be used as replacements for men overseas. This does not mean every man will be replaced because there are about 5,000,000 men overseas, and only about 3,000,000 still in the United States. The replacement process may be slow too, because of the decision to move directly to the Pacific theater 2,000,000 of the 3,500,000 men now in Europe.

If Judge Vinson is going to decrease the number of inductions before June 30, he will have to move fast because manpower officials say that draft boards will soon "clean out" all in the 26-30 group who did not succeed in getting certificates of essentiality from designated war agencies. War agencies estimate that draft boards are honoring up to 95 per cent of all certifications.

Draft calls after June 30 are expected to slip back to about 75,000 men a month, and are expected to be taken care of by the induction of 18 year olds.

The WPB Tools Division says it does not know, and will not know for some time, the full extent of machine tool cancellations caused by the termination of projects to make light artillery ammunition, and tanks. The

schedule openings as the result of terminations will be filled with machine tool orders for the automobile industry. WPB may grant the industry a AA-3 rating for this purpose.

Pre-VE-Day cuts in steel for ammunition will mean a reduction of 22,000 tons in military allotments in the second quarter and about 300,000 tons in the third quarter. This means that increased output planned for June, July, August, and September will not be realized and the second quarter rate of shell steel production will be continued until VE-Day.

WPB Chairman J. A. Krug says he did not say that overall cutbacks would amount to 50 per cent after VE-Day, but that he told automotive executives that in his opinion terminations would amount to more than 35 per cent within one year after VE-Day. Upon being asked how much more than 35 per cent, he replied that he thought about 15 per cent more. The WPB chairman told THE IRON AGE that he thought estimates that cutbacks would reach 75 or 80 per cent within one year after Germany is defeated, are too high.

Steelmen here are gloomy over prospects of early action by OPA in either firming up the interim price increases granted by the price agency in January, or adjusting all product prices generally. They point out that OPA is probably stalling through the adoption of new criteria until VE-Day, when the agency will again ask the industry for new cost and profit figures, because of lessened labor costs resulting from terminations, a more plentiful supply of labor, and a shortened workweek.

Adoption of new criteria for fixing prices is said to require ascertaining the overall profit position of the industry on new fabricated lines taken on by companies during the war, and from such subsidiary operations as coal mines and railroads.

Every phase of the war has produced some new word in federaleze, the language of government agencies. The latest is "zero" program. A "zero" program is one which is completely terminated with the end of the European War; its end product will have no place in fighting the Japs.

Another bit of federaleze is "Committee on Period One" which is the name of WPB's reconversion committee. Abbreviated, it is referred to conveniently as COP.

THE BULL OF THE WOODS

BY J. R. WILLIAMS





THE 6TH AVENUE "EL" WAS **NOT** SENT TO PEARL HARBOR!

In the January 22nd issue of TIME Magazine, we ran this illustration with a headline reading: "Remember when we sent the 6th Avenue 'El' to Pearl Harbor?"

This was a mistake.

The 6th Avenue "El" was *not* sent to Pearl Harbor — thanks to the straight thinking and vision of Mayor F. H. LaGuardia, Stanley M. Isaacs, Manhattan's Borough President, the support of the other members of the Board of Estimate of the City, and the strict adherence of the Harris Structural Steel Company, contractors for this work. The contracts for the demolition of the "El" stipulated that the scrap iron would not be sold or exported directly or indirectly to any foreign country with the exception of Great Britain. Not one pound of this scrap ever left the United States.

And that was three years before Pearl Harbor — back in the "appeasement" days!

It's too bad there weren't more men thinking straight in

those days. Because more than 6 million tons of scrap was sold to the Japs during those three years. And many an American boy was hit by fragments of that American steel — fragments of our own weak thinking in the past.

Well, we're strong now. America will come out of this war the most powerful force on earth, and the time to start *thinking strong* is now.

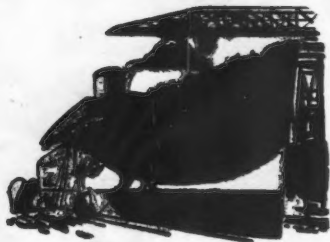
Our greatest immediate contribution to American strength in the future—strength here at home—must be the provision of jobs for our returning fighting men; jobs and security for all!

And today, the engineers of the machine tool industry can greatly help the men of government and of industry to provide those jobs . . . to plan now for the reconversion of our tremendous resources in materials and plant equipment to all-out production for a better America! One of these engineers is a Bryant man. We urge you to call him now.

BRYANT CHUCKING GRINDER COMPANY SPRINGFIELD VERMONT, U.S.A.

West Coast . . . OSGOOD MURDOCK

• West considers its loss in strong friendship of the late President . . . Maritime shipyards get what may be closing orders.



SAN FRANCISCO—As the days have passed since the sudden and tragic flash at 3 o'clock in the afternoon of April 12 here reported the death in line of duty of the late President and Commander-in-Chief at a crucial time in the conduct of the war and preparation for the peace and reconstruction, workers in war plants and members of management have joined with their fellow citizens, both in and out of uniform, to pay their respectful and sincere tribute to a great figure and to speculate on possible effects of his loss at this time on the coming weeks and months and years.

In his sympathy for and interest in the common man, the underprivileged and the overlooked, President Roosevelt has been accepted in this area as a friend of the far west. He favored decentralization of industry, development of natural resources and encouragement of small and independent operators. During his administration, even before the war, great flood control and irrigation dams in California, Oregon, Washington and Montana had been constructed, with accompanying major hydro-electric power developments which he worked to result in the benefit of the general public and the advancement of the region. As the war years came, there were appropriated astronomical sums of money for industrial facilities for steel, light metals, magnesium, aircraft, shipbuilding and munitions plants, along with military and naval establish-

ments. Probably more than the necessary minimum share of these were placed in the far west because of his confidence in the destiny, resources and potential accomplishment of this area.

Outside of its Senators and Congressmen the far west has been almost without direct representation in the higher brackets of the administration, with no member of the cabinet and no major administrator of either war or executive agencies outside of Chairman Eccles of the Federal Reserve Board and Justice Douglas of the Supreme Court.

Both former President Roosevelt and former Chairman Donald Nelson of WPB were impressed early in the war with the resourcefulness, enterprise and constructive imagination of Henry J. Kaiser and their close personal relationship and mutual confidence resulted in major war industry developments and remarkable production performance on the Pacific Coast at Portland, Richmond, Permanente, Fontana and most recently Denver.

Thoughtful observers try to imagine what possible effect, if any, the death of the former President at this time may have. It is suggested that possibly the Congress will occupy a relatively stronger position but that the war may be lengthened by reason of the necessary adjustment in political and administrative leadership and by reason of a possible temporary let down and loss of morale in the armed services. The confidence and faith which the former President held and commanded from the ranks of labor and from men in uniform is universally acknowledged and respected here. Production and campaigns continue to carry on, but with heavy heart and increased concern for the near and far future.

What are probably closing orders for major west coast Maritime shipyards were placed last month and neither Fontana nor Geneva mills have plate bookings beyond June. Though industrial labor shortage is still severe, particularly in munitions and naval establishments, the situation is relieving. The J. Barth and Co. index of Pacific Coast activity dropped in the last three weeks of March from 178.1 to 171.8 per cent of the 1930 average. A year ago for the corresponding period the index stood at 177.1. This composite combines weighted index figures for electric power, lumber and crude oil production and bank debits and carloading.

DOUGLAS AIRCRAFT CO. will discontinue its third or graveyard shift, April 30, at its Santa Monica plant. All of the 2500 employees effected will be offered jobs on the two remaining shifts. A month or two ago the Kaiser Steel Division switched from three 7½-hr. shifts to two 8-hr. shifts in the Fontana plate mill with the result that production increased, and the Douglas change involves no cut in production and is designed to increase output. In a surprise move last week the powerful AFL International Association of Machinists precipitantly withdrew from the special committee recently set up by the War Labor Board working to set up an umpire labor relations system for the aircraft industry. On the committee had been represented management and the CIO along with IAM. Chief IAM officials also announced that it was withdrawing from the West Coast Aircraft Committee and a restudy committee subgroup. This general withdrawal from labor-management conference relationship in the aircraft industry was said to conform with a general AFL position that government agency intrusion into employer-union relationships should be discouraged even under the conditions of wartime necessity.

SEATTLE.—A noticeable lag in the metal trade on the West Coast before postwar production gets under way is expected by Thomas J. Bannon, the forthright and energetic new president of the Western Gear Works at Seattle. He observes that the problem is not one of reconversion since wartime metals trades establishments have little prewar precedent to convert back to. He further points out that prospects in the Seattle area are not even as bright as in other localities which were more firmly established prewar than were the metal trades adjacent to Puget Sound. Such natural disadvantages as distance of raw materials, rail freight rates, geographical position, public apathy and labor misunderstandings are further factors. Offsetting advantages are climate, nearby availability of aluminum and proximity to the Orient. Mr. Bannon is particularly interested in arousing local interest on the part of other industrialists and labor leaders to retain and attain competitive long run production. During the past

Above: A Machine. The section is advanced, the spindle differential end and machine is hydraulic combination of push-bushing

NO the acc pro is v wa des lea tou

45-52

EX

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HERE'S THE ANSWER TO *Your* PRODUCTION PROBLEM

See EX-CELL-O first



Below: Ex-Cell-O designed and built Precision Way Machines turn out accurate metal parts on a high production basis (a few typical parts are illustrated). These single-purpose machines (in many cases made highly flexible by the new Ex-Cell-O type of bolted-section construction) often perform numerous operations in one setting, bringing not only a substantial increase in the number of parts produced but also improved quality and reduced unit cost.

Above: A typical application of an Ex-Cell-O Precision Boring Machine. This particular machine is a three-way type. The center section is designed to hold the part rigidly while the spindles are advanced, the holes being bored in exact relation to each other. The spindles have individual adjustments. The part shown here is a differential carrier steel casting, with two holes finish bored at each end and one from the rear, simultaneously. Each wing of the machine is individually set as to speed and feed with its own hydraulic feed panel. Once the most efficient speed and feed combination is reached, the whole machine is controlled by means of push-buttons, located for the operator's convenience. The machining cycle is automatic after the "start cycle" button is pressed.



NOW is the time to consult Ex-Cell-O about your future production requirements . . . about the use tomorrow of production machines that will give you definite advantages in speed, accuracy and finish, that will enable you to get unit cost down to a competitive basis. Your problem may be readily solved by machines designed and built for your specific needs. That is why, when designing your postwar product, you should plan at the same time for the best way in production. For more than a quarter century Ex-Cell-O has been foremost in the design and construction of special multi-purpose and semi-standard machines for America's leading industries, large and small. This valuable "know how" is at your disposal. Get in touch today with Ex-Cell-O at Detroit or with any of its field engineers in 32 other cities.

45-52

EX-CELL-O CORPORATION DETROIT 6 MICHIGAN

Standard and Special Multiple Way-Type Precision Boring Machines

Multiple Drilling and other Special Purpose Machines

Precision Thread Grinding Machines

Precision Lapping Machines

Broaches and Broach Sharpening Machines

Continental Cutting Tools

Tool Grinders

Hydraulic Power Units

Grinding Spindles

Drill Jig Bushings

Fuel Injection Equipment

R. R. Pins and Bushings

Pure-Pak Paper Milk Bottle Machines

Aircraft and Miscellaneous Production Parts

week the last B-17 Flying Fortress rolled out of the final assembly doors at the Seattle Boeing plant, and with it 6,891 B-17's had been completed and accepted from Seattle since the day back in 1936 when the Army Air Forces ordered the first 13 Fortresses. Outdating all pursuit ships of its day, it has had a remarkable 10-year life in wartime and has become a major aerial weapon to America's forces in the European war. Douglas and Lockheed continue to produce Fortresses while Boeing is confined to B-29's at all its plants, Renton, Seattle, Vancouver and Wichita as well as the western Washington branch plants.

Boeing announces that its wage payroll last year was \$217,044,062 of which \$82,000,000 was at Wichita, over \$24,000,000 at Renton and \$110,000,000 at Seattle and the branches at Aberdeen, Bellingham, Chehalis, Everett, Hoquiam and Tacoma.

The independent United Brotherhood of Welders, Cutters and Helpers has lost three big plant elections in five days but is undaunted. Welders at the Puget Sound Bridge and Dredge Co., Seattle, voted 2205 to 479 against striking and Todd Pacific Yards at Tacoma with 20,000 eligible to vote decided 6570 to 2550 not to strike. At the Everett Pacific Yard at Everett the result was 2397 to 388. A collective bargaining election will now be held at Young Iron Works to determine whether the Welders or AFL will represent welders and cutters at the plant.

A new type cycloidal marine propeller extending downward from the bottom of the ship and eliminating the use of a rudder will be installed on two vessels at the Everett Pacific Shipbuilding and Drydock Co., one an Army tug and another a Navy landing ship. The propeller is the invention of Prof. Frederick Kirsten of the University of Washington, the same man who designed the Kirsten tobacco pipe. The first propellers were constructed by the Pacific Car & Foundry Company at Renton and resemble nothing more than a huge egg beater. Two are placed in each ship. The landing craft's props are 8 ft. in diam. equipped with six blades, four 1 ft. deep and 1 ft. wide. They rotate on a vertical axis and are so arranged that the direction of thrust can be altered to any position. Blades normally turn 200 r.p.m. but can reach 225. They are driven by 1800 hp. diesel engines. To install the props will require several months in rebuilding the aft sections of the tug and landing craft and relocate the

engines. Both ships were previously designed for standard wheels. After vainly attempting to interest the American Navy years ago, Prof. Kirsten sold manufacturing rights to German interests and it is understood that its performance in Europe and reports in German technical magazines have now attracted official American attention.

Western Steel Report Issued by H. F. Bain Washington

• • • Qualified with important provisions, a report by Dr. H. Foster Bain, former director and now a consulting engineer of the Bureau of Mines, says that favorable opportunities exist for the west's war expanded steel industry in the post-war period.

The report says there are some serious obstacles to overcome but points out that although the war expansion has more than doubled the productive capacity of the western steel plants, there has also been an expansion of population and an increase in steel consumption. Dr. Bain added that adaptation of the plants to western needs, accompanied by an aggressive marketing program, might result in new plants, products.

Realistically, Dr. Bain said that the operation of the new plants after the war will depend first upon adequate financial backing and recapitalization to write off the costs chargeable to the war.

Bain then lists three conclusions:

1. Adequate raw materials are available and the defects in quality can be overcome. Reasonably competitive assembly costs can be obtained.

2. Existing markets can support production in plants of economic size, subject to the usual vicissitudes

of the steel business but permitting expectation of growth.

3. Under capable management, operating with competitive conversion costs should be possible.

During the past four decades the 11 Western states have been growing more rapidly than the remainder of the country, Dr. Bain reported, and their population has increased 240 per cent as against 64 per cent for other states. The West's steel producing capacity now is 4,655,000 net tons of ingots annually, as compared to 2,019,000 tons before the war. The prewar market for steel products in these states, Dr. Bain said, was equivalent to about 3,500,000 tons of ingots, of which a substantial part came from Eastern states.

Although there are several barriers to postwar operation of the new western steel plants at a reasonably satisfactory rate, they are not insurmountable, according to Dr. Bain, who lists the problems to be overcome as follows:

1. Recapitalization to eliminate that part of the investment chargeable to war expense and provision of adequate financial backing to meet required postwar adjustments.

2. An aggressive marketing program to developed outlets for more steel products and to capture markets previously supplied by eastern plants. Light, rather than heavy, steel products offer the best opportunity for expansion; the potential market for steel in tin plate and tubular goods manufacture is substantial.

3. Radical adjustments in freight structure.

4. Technical progress to overcome, including (A) Limiting effects of certain impurities in western ores, (B) Deficiencies in western coking coals and lack of markets for byproducts and (C) Possible future deficiency in local scrap supply.

The report points out that it would be unreasonable to expect that the war time rate of western operations will continue but production can drop considerably and still be at what was considered satisfactory.

"There will be," Dr. Bain said, "Periods of slack demand and probably shutdowns will be necessary in the West, as in the East, but more and more steel will be made in the western states and if local manufacture of products made from steel is pushed vigorously the employment situation may be materially helped and a sound industrial structure created and maintained."

Cited for Awards

• • • The following companies have received Army-Navy "E" awards for outstanding war production:

Electric Storage Battery Co., Philadelphia.
(fifth star)
Glidden Co., Metals Refining Division, Hammond, Ind. (second star)
U. S. Spring & Bumper Co., Los Angeles.
(second star)
Hamilton Foundry & Machine Co., Hamilton, Ohio. (third star)
American Welding & Mfg. Co., Warren, Ohio.
Ford Motor Co., Willow Run Bomber Plant, Ypsilanti, Mich.
Waldes Koh-I-Noor, Inc., Long Island City, N. Y.
Ward Machine Co., Brockton, Mass.

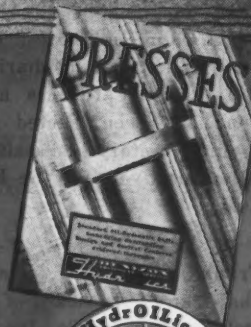
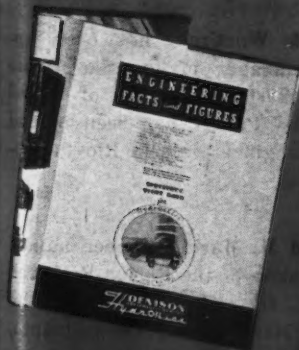
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Valuable in 2 Ways!**



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tured bulletin that
gives the right an-
swers to questions
about 5 to 200-ton
Denison HydroILic
Presses, plus useful and
frequently needed hy-
draulic engineering data.

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The Asking**

This new bulletin is packed with the kind of complete hydraulic press data you want. Note in the typical page above how the conveniently tabled specifications and detailed drawings give you facts quickly—without fuss or frills—on Denison's complete line of standard HydroILic presses in the 5- to 200-ton range. And in addition, you'll find the tables on pages 19 to 29 a most helpful collection of hydraulic engineering data. Write for your copy of this new bulletin today . . . on your company's stationery, please. The Denison Engineering Co., 1158 Dublin Road, Columbus 16, Ohio.



DENISON
EQUIPMENT in APPLIED
HydroILics

PERSONALS



FREDERICK H. NORTON, assistant vice-president, Sales Department, American Car & Foundry Co.

• Frederick H. Norton has been appointed assistant vice-president in the sales department, American Car & Foundry Co., New York. Prior to joining ACF, Mr. Williams served as war production engineer at Washington for American Steel Foundries.

• H. F. Millman, who joined the Geuder, Paeschke & Frey Co., Milwaukee, 45 years ago, has been elected president of the firm. Mr. Millman has been successively purchasing agent, director of purchases and vice-president.

• F. S. Elfred, Jr., has been appointed general manager of the Explosives Division, Olin Industries, Inc., East Alton, Ill., and its subsidiaries. R. R. Casteel, John Caruthers and E. J. Krupp have been elected secretary, assistant secretary and assistant treasurer, respectively, of the Explosives Division.

• Franklin Farrel, Jr., has resigned as chairman of the board of directors, Farrel-Birmingham Co., Inc., Ansonia, Conn., and Alton A. Cheney has been elected to succeed him.

• Max W. Parmalee has been appointed New York district manager of the Square D Co., Detroit, succeeding the late H. R. Allen. Earle J. Rooker succeeds Mr. Parmalee as Cleveland district manager.

• Clayton F. Fisher has been elected president and general manager of Sleeper & Hartley, Inc., Worcester, Mass., and Raymond F. Russell has been named vice-president and treasurer of the corporation. William H. Blount, former president, has retired because of ill health.

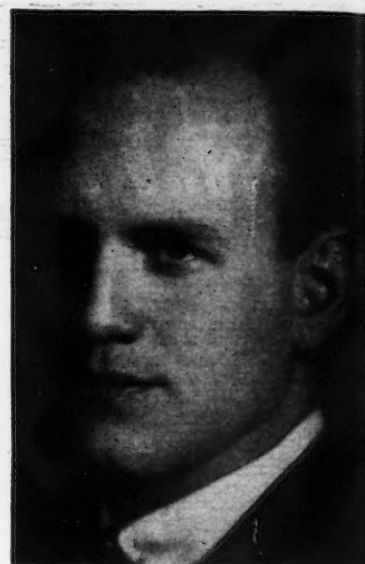
• William T. O'Connor, previously general purchasing agent, has been elected vice-president of Manning, Maxwell & Moore, Inc., Bridgeport, Conn.

• George H. Bockius has been elected president of Diebold, Inc., Canton, Ohio, succeeding A. J. Rose, resigned. Lyman H. Clark, John H. Raber, A. W. Jackson and John P. Paca have been elected vice-presidents of industrial relations, factory operations, sales and engineering, respectively.

• Matt Koener has been named chief inspector of Caterpillar Tractor Co., Peoria, Ill., succeeding M. D. Johnson, resigned.

• D. P. Morgan has joined the sales staff of the Pittsburgh Steel Foundry Corp., Glassport, Pa., as assistant sales manager of the Philadelphia district.

DOUGLAS W. VERNON, general manager of sales, A. Leschen & Sons Rope Co., announced on p. 92 of the April 12, 1945, issue of *The Iron Age*.



WALTER I. FLOYD, president, Duff-Norton Mfg. Co.

• Walter I. Floyd, formerly executive vice-president, has been elected president of the Duff-Norton Mfg. Co., Pittsburgh, succeeding Robert G. Allen, resigned. E. M. Webb has been elected vice-president and general manager.

• A. H. Keetch has been made director of the newly organized sales-service department of the Warner & Swasey Co., Cleveland, after a two years' leave of absence on government service. Mr. Keetch served as chief of Priorities and Distribution Branch, WPB Tools Division, Washington.

• Charles C. Layman, formerly vice-president, has been elected president and general manager of Aeronautical Products, Inc., Detroit, succeeding the late Alfred Jackson. M. J. Whitfield has been promoted to executive vice-president.

• Patrick W. Cross has been appointed manager of the Sao Paulo office of Westinghouse Co. of Brazil and W. W. Parker has been named regional engineer in the Rio de Janeiro office.

• Howard M. Marie has been named representative of the Rheem Research Products, Inc., Baltimore, in the southern New Jersey, Pennsylvania, Maryland and West Virginia territory.



another
**VICTORY
TECHNIQUE**

Kux 150-ton automatic
press for powder metals
manufactured by Kux
Machine Co., Chicago

A NEW NOTE IN THE METALLURGICAL SYMPHONY...

Powder METALLURGY

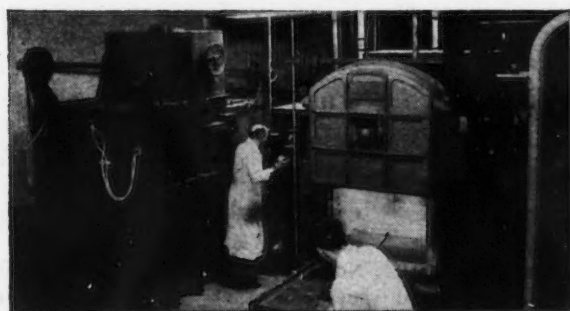
BEFORE the ancients worked with molten metal they fabricated simple implements from metal powder. Yet it was not until the vast needs of World War II that the development was forced to practical proportions. Now thousands of parts pressed from powdered metals and sintered in a controlled atmosphere furnace are being used in weapons of war and accessories at a great savings of time or cost or both.

One order of 40,000,000 small parts was produced for the navy at the rate of 520 pieces per minute by powder metallurgy. A piece of Ordnance from powder metal effected a saving in cost of about 70%. And the same story applies to a vast multitude of parts from powdered iron, bronze, aluminum,

silver, tungsten, platinum.

Powder Metallurgy is one of the many Victory Techniques that have infinite postwar possibilities and about which you must learn if you are to meet competition. Your Lindberg representative is eager to help you in any possible way. Discuss with him the new developments in powder metallurgy, sintering, brazing, and treatment of metals by heat in any form.

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A Battery of Lindberg Brazing Furnaces in operation

Lindberg
FURNACES

SUPER-CYCLONE for hardening, normalizing, annealing, tempering

CYCLONE for accurate, low-cost tempering and nitriding

HYDRYZING for scale-free and decarb-free hardening

PERSONALS

• **Joel B. Gibson** has been appointed vice-president in charge of planning and engineering for the Southern States Iron Roofing Co., Savannah, Ga.

• **Maynard E. Montrose**, formerly vice-president of Lane-Wells Co., Los Angeles, has been elected president and general manager of Marion Steam Shovel Co., Marion, Ohio, succeeding Carl F. Lamarche, resigned. **Harvey T. Gracely** has been elected to a newly-created vice-presidency.

• **L. Earle Welch** has been elected vice-president of the Industrial Hard Chromium Corp., Newark, N. J., and will head a newly established division of engineering research and development.

• **Frederick R. Lack**, vice-president of the Western Electric Co., N. Y., and manager of its Radio Division, has been elected to the board of directors.

• **Gilbert D. Dill** has been appointed sales engineer of the American Foundry Equipment Co., Mishawaka, Ind. **John C. Straub**, for the past 13 years associated with the Research Laboratories Division of General Motors Corp., has joined the company as research engineer.

• **Nathan R. Johnson**, factory manager of the Buffalo Forge Co., Buffalo, N. Y., has been elected a director of the company.

• **Arthur A. Schuenemann** has been named metal finishing service engineer for the Udylyte Corp., Detroit, and **William H. Moyer** has been appointed Philadelphia representative and service engineer operating out of Udylyte's New York office.

• **George R. Mellema** has joined the Mixing Equipment Co., Inc., Rochester, N. Y., as representative of the territory, including Minnesota, North Dakota, South Dakota and the western section of Wisconsin.

• **Glenn Gordon** has been appointed purchasing agent for Ingalls Iron Works Co. and Ingalls Shipbuilding Corp., Birmingham, Ala.



S. B. HEPPENSTALL, JR., vice-president, H. K. Porter Co., Inc.

• **S. B. Heppenstall Jr.**, has been elected vice-president of the H. K. Porter Co., Inc., Pittsburgh. Mr. Heppenstall was formerly vice-president in charge of sales of the Heppenstall Co.

• **C. B. Johnson**, formerly factory manager of Woodall Industries, Inc., Detroit, has been elected second vice-president of the firm.

• **Fessenden S. Blanchard** has been appointed director of marketing, Thompson & Lichtner Co., Inc., Boston.

• **L. J. Purdy** has been elected director and vice-president in charge of trucks, Dodge Bros. Corp., Detroit, a Chrysler division. For the past seven years Mr. Purdy has been general manager of the Dodge truck plant.

• **Carl A. Salmonsén**, formerly assistant manager of the Lynn, Mass., River Works, General Electric Co., Schenectady, N. Y., has been named manager of the company's Philadelphia Works. Mr. Salmonsén has been connected with General Electric since 1909.

• **Comdr. R. E. W. Harrison** has rejoined the Chambersburg Engineering Co., Chambersburg, Pa., as vice-president in charge of sales, following his release by the Navy to an inactive duty status after serving four years as a staff officer in various bureaus and offices of the Navy Department.

• **William F. Tuttle** has been appointed assistant chief engineer, General Engineering Division, The American Rolling Mill Co., Middletown, Ohio.

• **L. E. Meidinger**, Milwaukee district manager of Bliss & Laughlin, Inc., Harvey, Ill., for the past 31 years, has retired.

• **H. S. Pahren** has been appointed plant manager and **F. E. Millan**, sales manager of the Ridgway Division, Elliott Co., Jeanette, Pa.

OBITUARY...

• **Amedes H. Smith**, president of the Willamette Iron & Steel Co., Portland, Ore., chairman of the board of directors, Hyster Co., and a director of the Portland General Electric Co., died March 25 at the age of 76.

• **George J. Genebach**, president of United Steel & Wire Co., Battle Creek, Mich., died recently.

• **John J. Garvey**, superintendent of the Elwel Iron Works, Springfield, Mass., died April 5.

• **William H. Marquardt**, 62, consulting engineer of the Buffalo, N. Y., Houde Engineering Division, Hou-daille-Hershey Corp., Detroit, died April 4.

• **Walter E. Miller**, former vice-president, treasurer and director of Fairbanks, Morse & Co., Chicago, and a director of Canadian-Fairbanks-Morse Co., Ltd., Montreal, died recently after a brief illness at the age of 81.

• **Leroy F. Johnson**, 53, for the past ten years Chicago district sales manager of the Vanadium Corp. of America, New York, died March 9, at Elmhurst, Ill.

• **Harry L. Chisholm**, former secretary of the Atlas Steel Casting Co., Buffalo, N. Y., died March 21.

• **Leland Russel Van Wert**, 53, consulting metallurgist for Leeds & Northrup Co., Philadelphia, and former assistant professor, Carnegie Institute of Technology, died recently.

Deliver 'em faster...

with T-J AIRCRAFT RIVITOR

● For aircraft and similar assemblies requiring flush riveting...the T-J Air-Powered RIVITOR does the job with *top speed and accuracy!*

Combines "air squeeze" action and automatic feed...no manual rivet handling! Easy for women operators. Furnished with adjustable setting tools and interchangeable lower horn to accommodate wide range of work. Throat depths up to 36". Backed by T-J leadership in engineering and manufacturing...proved on production lines meeting tough war schedules! Write for latest bulletin. The Tomkins-Johnson Co., 605 Mechanic St., Jackson, Michigan.

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS



**HANDLES
FLUSH RIVETING**

**AUTOMATIC
FEED**

**THROAT DEPTH
UP TO 36"**

**FOR HIGH SPEED
RIVETING**

**AIR SQUEEZE
ACTION**

**ADAPTABLE FOR MANY TYPES
OF RIVETS**

Dear Editor:

WINCH SHORTAGE ERROR

Sir:

In the Assembly Line of Feb. 15, it is stated that General Motors Co. fell behind in its production of trucks because of failure of the White Motor Co. along with another manufacturer to supply winches for them. The White Motor Co. has never manufactured winches, but its production has suffered because of inability to get them. In supplying scout cars, half-tracks, prime movers, and cargo carriers to the Army we have consistently been ahead of schedule.

GEORGE H. SCRAGG,
Director of Advertising

White Motor Co., Cleveland 1

● This error was caused by a garbled dispatch from Washington which should have read: "General Motors Corp. fell 15 per cent behind its schedule on 2½ ton 6 x 6 (six wheel drive) dump trucks because of failure to receive enough Gar Wood winches from St. Paul Hydraulic Hoist Company and White Motor Co. lost production of 34 of the ten ton 6 x 6 wreckers for the same reason." The transcriber of this story figured that the period after "White Motor Co." meant the end of the sentence, and then started a new sentence with the word "Lost." We inserted the word "and" after "White Motor Co." for what seemed to be clarification, and that piled error upon error. However, we should have known enough about your operations to realize you did not make winches even during the war.—Ed.

CUTTING SPEEDS

Sir:

We would appreciate information on the proper speed to run a band saw blade, cutting off gates and risers on manganese bronze castings. We have had recommendations which do not seem to check, since they vary from 120 ft. per min. to 1000 ft. per min. We are operating our saw at 348 ft. per min. with very good results using ½ in. wide blade and 10 tooth spacing on the saw.

D. P. ALLEN,
Chief Engineer

Rensselaer Valve Co.,
Troy, N. Y.

● There is a wide disparity between recommended cutting speeds. American Machinist's Handbook gives 150 to 350 ft. per min. for this material and the book on DoALL contour saws lists cutting speeds of 225 to 360 ft. per min. for material ranging from ¼ in. to 1 in. Most tables of speeds and feeds give average figures and generally recommend that the data be worked out for each job based on experience.—Ed.

PHILADELPHIA SCRAP

Sir:

We are engaged in a study of steel-making practices to develop whether economies could be effected by a change in our present methods. In

this connection we should appreciate a comparison of prices of the following grades of scrap in Philadelphia during the first week of Oct. for each year since 1920: Low phos. plate, low phos. punchings, heavy forge turnings, cupola cast, stove plate cast, charging box cast and cast iron borings.

It would be helpful to us to know whether or not a good supply of these grades of cast iron scrap was available in Philadelphia from 1920 to 1940.

CHARLES M. BROOKS,
Secretary
Lebanon Steel Foundry, Lebanon, Pa.

● The compilation of scrap prices is enclosed. A brief resumé of the Philadelphia market for the first week in Oct. during those years has also been included.—Ed.

POWDER PARTS MAKERS

Sir:

Please send list of manufacturers in the powder metallurgy field. I have in mind the manufacture of several hundred mold metal pieces of complicated design and requiring accuracy.

D. H. WELLS,
Chemist

Purolator Products, Inc.,
Newark 5, N. J.

● The following manufacturers of metal powder products may be in a position to quote on your requirements: Olite Bearing Div., Chrysler Corp., Detroit; Moraine Products Div., General Motors, Dayton; Plastic Metals, Inc., Johnstown, Pa.; National Molded Products, Inc., St. Marys, Pa.; and Powder Metallurgy, Inc., Long Island City, N. Y.—Ed.

METAL ETCHING

Sir:

In the Nov. 30 issue you refer to the Lectroetch electrolytic etching process. Please send us the address of this concern as we would like to obtain further information on the process.

F. A. DANIELS,
Development Engineering Division
E. I. du Pont de Nemours & Co., Inc.,
Wilmington 98, Del.

● Lectroetch is an electrolytic etching process being used in England. Similar equipment for marking metal by electrolytic action is made by Acme Metal Marking Equipment Co., 2232 West Fort St., Detroit 16. This equipment is named Met-L-Etch.—Ed.

LOW COST PRODUCTION

Sir:

We desire authoritative advice on hot forging, coining or other rapid production methods for a shoe retainer and port plate to permit production of these parts at the lowest possible cost. We have been manufacturing them by standard machine shop methods from bar stock but this is entirely too slow for our future requirements. The thickness of these parts can be reduced to ¼ in. if

necessary to facilitate production. We can also use other steels, Nitralloy "G" in the annealed state being preferred, although we will consider any carburizing steel like 8620 that will promote all-around efficiency. If you can help us your suggestions will be welcome and we would appreciate being referred to a competent authority on the subject.

S. H. ORR,
Chief Tool Engineer
Denison Engineering Co.,
Columbus 16, Ohio

● It appears that these two pieces can be made by coining heavy gage material like ⅛ in. plate rather than by hot forging, as the tolerances given are entirely too close for normal forging practice. This is particularly true in view of the fact that all forgings require a draft angle of at least 3 deg. on all vertical surfaces. We suggest that you present your problem to the Detroit Stamping Co., 350 Midland Ave., Detroit 3. In our Sept. 14, 1944, issue, an article was published on their plant practice under the title "Coining Heavy Gage Stampings."

Perhaps the port plate can be made as a precision casting in a refractory mold by the lost wax process. While most of such castings in the past year or two have been alloys of the Stellite series that are difficult to forge and machine, we have recently run across some applications to small, intricate parts made of the ordinary alloy steels. If interested we could offer a bibliography of articles we have published and send names of jobbing precision casting plants.—Ed.

PRECISION THREAD ROLLING

Sir:

Will you kindly send me the issue of THE IRON AGE containing the article entitled "An Appraisal of Precision Thread Rolling Practice" by Frank J. Oliver. I find I can use the information in my work.

DONALD APPLEBY,
Gage & Hob Engineer

Pipe Machinery Co.,
Cleveland, Ohio

● We reprinted the three articles comprising the series and a copy has been mailed at cost, 25c.—Ed.

SUB-ZERO TREATMENT OF STEELS

Sir:

We are very much interested in the article Sub Zero Treatment of Steels which appeared in your Jan. 11 issue. Will you kindly send us reprints of your other articles on the same subject?

M. R. WOOD,
Director of Engineering & Research
General Aircraft Equipment, Inc.,
South Norwalk, Conn.

● Tear sheets mailed.—Ed.

QUALITY CONTROL

Sir:

The article on "A Simplified Approach to Quality Control" by George O. Cutter in the Feb. 15, 1945 issue is of interest and I should appreciate a copy.

A. M. SMITH,
Chief Inspector
H. A. Smith Machine Co.,
Hopewell, N. J.

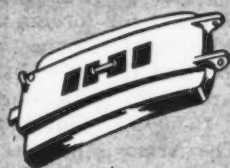
● Tear sheets mailed.—Ed.

WHEELABRATOR engineered to answer any cleaning problem

THE diversity of applications handled by the airless Wheelabrator is quite different and more extensive than the every-day prosaic tasks ordinarily expected of blast cleaning machines.

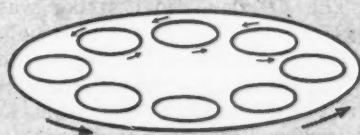
You will find it employed, for example, on such unusual and difficult jobs as: removing burrs from machined parts, "patterning" leather surfaces; graining photo-lithographic plates; renovating used steel drums; and surfacing the cores of printing rollers prior to rubberizing.

The Wheelabrator is engineered to answer any cleaning problem faster and at lower cost. The facts to prove that the Wheelabrator can do this *for you* are yours for the asking . . . simply tell us your problem and we will submit the supporting evidence immediately.



THE PLAIN TABLE

The Plain Table is particularly well adapted for the plant handling work that does not have too many pockets and vertical edges. A single rubber-covered table is provided on which the work is carried into the Wheelabrator blast zone. Supplied with tables 6', 8', 10' and 12' diameter.

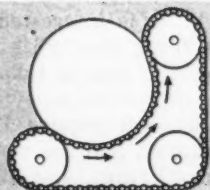


THE MULTI-TABLE



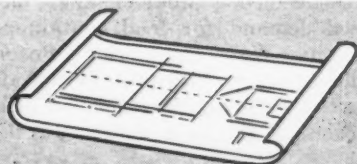
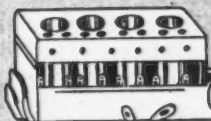
For cleaning flat or fragile castings, forgings, stampings or heat-treated parts which cannot be tumbled.

The work is placed on rubber-covered tables which automatically revolve in passing through the Wheelabrator blast zone. This action completely presents all exposed surfaces to the abrasive blast. Made in sizes for all requirements.



THE TUMBLAST

An exclusive AMERICAN principle — the endless conveyor method of tumbling — completely exposes all surfaces of every piece to the full effect of the abrasive blast. Experience has shown that no other blast mill designed for tumbling work can match the effectiveness of this design. Made in seven sizes with capacities ranging from 1 cu. ft. to 30 cu. ft.



SPECIAL CABINETS

Wheelabrator Cabinets are designed for handling work where special production requirements prevail or where work, due to its size, shape, or weight, cannot be adapted to a standard machine. Examples of work handled in Special Cabinets includes: cylinder blocks, sanitary ware, radiator sections, pipe, axle housings, steel billets, etc.

American

FOUNDRY EQUIPMENT CO.
510 SOUTH BYRKIT ST., MISHAWAKA, IND.



WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

This Industrial Week . .

- **Order Volume Continues to Be Heavy**
- **Coal Strike Fades in Pittsburgh District**
- **Third Quarter Shell Steel Cutback 300,000 Tons**

STEEL order volume continued strong this week, as additional directives loaded order books. This continued pressure lengthens the comparative gains for 1945 over the previous year. Meanwhile consumer pressure for maintenance of open tonnage delivery promises has amplified at a number of points due to reduction of inventories growing out of the recall of substantial WPB second quarter allotments.

The unofficial coal strike was gradually dying away in the Pittsburgh region, although miners availed themselves of the opportunity to mourn the death of the late President, and steel production in the district gained 9.5 points from last week's revised rate of 82 to 91.5 per cent of capacity. In Birmingham the miners early in the week were still idle. Finished steel, as well as open hearth and blast furnace operations were being affected.

Complaints on sheet deliveries have appeared in recent days, although other pressure for accelerated deliveries is being alleviated by the continued inability of steel users to attain full production because of manpower shortages. Some customers have been given assistance through placement in scattered spot openings for regular bars, hot rolled strip, universal mill products and sheared plates.

Can companies, largest users of tinplate, report that their steel supply situations are becoming serious. The reduction of tinplate supply caused by the switching of sheets into other channels has coupled with increased demand for food containers to provoke this situation. War Production Board Vice-Chairman Batcheller states that present container programs are going to be increased or at least held at present levels regardless of the turn of events in Europe.

ACCORDING to present schedules third quarter production of shell steel billets is expected to drop 300,000 tons below the second quarter output, and will remain about the same from then throughout the year. Military authorities still caution that new programs being contemplated may take up much of the slack of VE-Day cutbacks.

Warehouses are continuing heavy demands on mills for steel, with the general warehouse situation being one of low inventories and poorly balanced stocks. A few warehouses are in fair shape, but they are in the minority.

Pressure for production of landing mats is increasing, and Macomber, Inc., has received an order for 1200 Treadway bridges, supplementing an order for 1500 now in production. While operations for the Maritime Commission in general continue to decline, some orders for masts and booms are coming in. Makers of rocket parts, chemical shells, and rubber machinery are anticipating no slackening in the demand for their products.

CANADIAN steel production is at present operating at around 90 per cent of capacity, and pig iron production at about 67 per cent, due to manpower shortages. With the possible exception of plate, of which delivery is available in July, producers are in no position to make delivery promises on new orders. Sheet and bar mills in Canada are booked into the last quarter, and even for the last of the year delivery dates are questionable. Minor tonnages only are available for civilian production, and are not expected to increase until VE-Day. Cutbacks at that time are expected to approximate 20 to 40 per cent.

The American Army is reported to have revised its program on freight car equipment for foreign use. It now stands at around 10,000 cars of various sorts for Belgium, 38,250 for France, and 6000 for India. This is entirely a long range program to be started off with construction of around 10,000 cars during the fourth quarter of this year. The Army is believed to be ready to make new inquiries to car builders, but they will be comparatively minor alongside the planning enumerated.

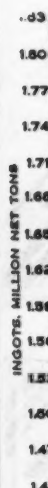
Major construction awards of the week include one for 3800 tons of steel to Bethlehem Steel Co. for Navy storehouses at San Diego. An inquiry is being made by Commonwealth Edison Co., of Chicago, for a boiler and turbine room additions to require 300 tons. Building circles report that Rockefeller Center, New York, is interested in about 6000 tons of structural for a new office building. Mansfield Tire and Rubber Co. was to take bids this week on structural steel required for a new tire plant. A Cleveland trailer company will require 1750 tons of shapes and bars for trailers, another concern 1400 tons of bar angle for barrel rings, and a machine tool company in that district 4000 tons of bars for chemical shell bodies.

National steel ingot operations have gained four points this week to 96.5 per cent, from last week's revised rate of 92.5 per cent. In Pittsburgh, the operating rate has gained nine and a half points to 91.5 per cent, from last week's revised rate of 82 per cent. Youngstown operations are up six and a half points to 93.5 per cent and in Cleveland ingot output has risen half a point to 98.5 per cent. Other district gains include Wheeling, up three points to 89 per cent; Cincinnati, up four and a half points to 100 per cent, and the Eastern District, up 12.5 points to 105.5 per cent. Southern operations, because of the coal strike, have dropped four points to 75 per cent from last week's revised rate of 79 per cent. Detroit output is down half a point to 97.5 per cent, and in the West, the operating rate has declined four points to 86.5 per cent. Chicago at 99.5 per cent; Philadelphia at 95.5 per cent; Buffalo at 104.5, and St. Louis at 94.5 per cent continue unchanged.

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• **PORCELAIN STEEL**—Porcelain enamelware manufacturers received 35 per cent less steel in the second quarter of the current year as compared with the first quarter, according to the WPB. Procedure followed in allotting the reduced amount of steel was as follows: Manufacturers in Group 1 and 2 labor areas were allotted 50 per cent as much steel as in the first quarter; manufacturers in Group 3 and 4 labor areas were allotted 85 per cent as much as in the first quarter. The enameled cold pack production program was 15 per cent less in the second quarter than in the first, WPB officials said. It was pointed out, however, that manufacturers may be able to offset reductions in allotments by purchasing steel that has been declared idle and excess inventory. Flat rolled sheets, 28 gage and heavier, are still critical, WPB said, and the situation is not expected to ease until military orders are cutback.

• **CANADIAN STEEL**—Production of steel ingots in Canada during February totalled 250,464 net tons, compared with 268,722 tons for January, and 229,852 net tons in February of last year. Output in the month included 235,602 tons of ingots, and 14,862 tons of castings. The fact that steel production in this country is running only around 90 per cent of rated capacity is largely due to the shortage of labor. The overall situation is said to be as serious as at any time during the war.

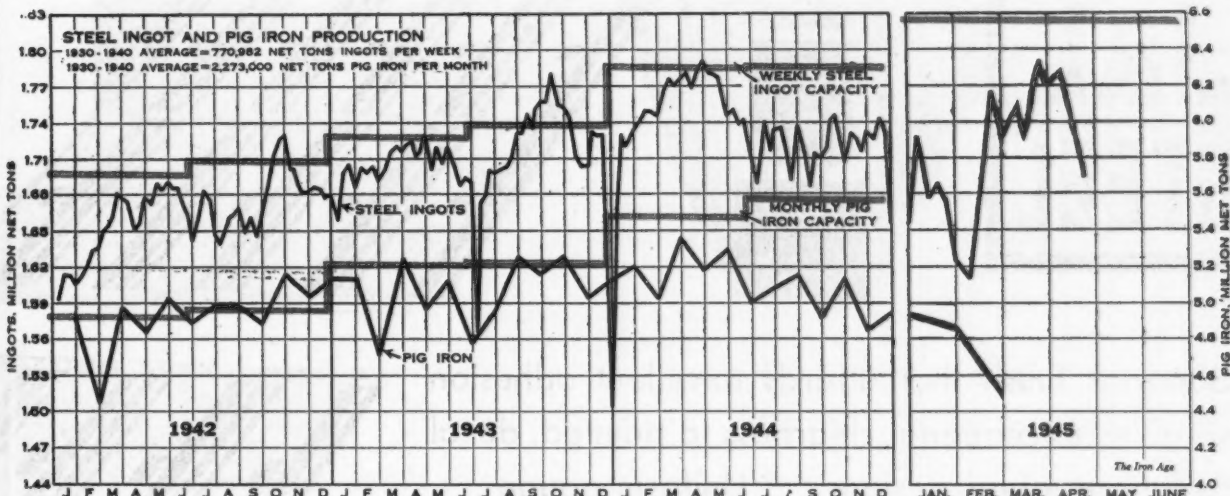
• **CANADIAN IRON**—Pig iron production in Canada in February amounted to 149,487 net tons, compared with 155,969 tons in January, and 141,878 tons in February a year ago. For the month pig iron output included 126,637 tons of basic iron, of which 8180 tons were for sale and the balance for further use of producing companies; 9403 tons of foundry iron and 13,447 tons of malleable iron, all of the latter two grades being for sale. For the first two months of the year cumulative pig iron production totalled 305,456 tons against 274,006 tons in 1944 and 254,567 tons in 1943. During February nine of Canada's 14 furnaces were in blast, with five blown out. Blast furnace charges in the month included 267,124 tons of iron ore, 20,333 tons of mill cinder, scale, sinter, etc., and 5678 tons of scrap iron and steel.

• **GOON GUN**—Developed long before the war by the Chemical Warfare Service, the 4.2 mortar has become one of the Army's most versatile weapons. Latest wrinkle is its use from special assault craft for the support of invasions. It is used to fill the gap before artillery can be landed to support the infantry, and was used first at Palau. First operations were conducted by infantrymen, who have long used the 4.2 as a standard piece, but regular Navy crews are now doing the firing.

• **RAILROAD BUSINESS**—Export demand for locomotives is likely to continue strong for four to five years, while domestic orders are also expanding. Estimated demand for diesel switchers is about 3000, and for diesel road engines about 500, according to a survey by Standard & Poor's Corp. On March 1 locomotive builders had orders from Class 1 roads for 546 locomotives, of which 138 were steam, and 406 diesels. Government checkers estimate that on domestic railroads there is a shortage of 2146 locomotives. This year 45,000 freight cars are booked for production, and 8384 new cars were put into production during the first two months.

• **SHEET MILL STRIKE**—Work resumed last weekend for the first time in over a month at the sheet and tin mill of the Carnegie Illinois Steel Corp., Gary, following a slowdown which blossomed into a walkout. About 1000 men were involved, and approximately 85,000 tons of rolled products needed for war uses were lost. The slowdown began March 11, when a new schedule of pay rates based on productivity was posted. The slowdown continued without a grievance being filed by the USWA-CIO and on April 9 the men failed to report to work.

• **STEEL CONSTRUCTION**—McLouth Steel Corp., Detroit, is understood to be making plans for the construction of a new plant in the motor city which will be able to process around 200,000 tons of slabs annually. Planning is definitely in the preliminary stage at present.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
April 10.....	82.0*	99.5	87.0	95.5	98.0*	104.5	86.0	79.0*	93.0	90.5*	95.5	94.5	93.0	92.5*
April 17.....	91.0	99.5	93.5	95.5	98.5	104.5	89.0	75.0	97.5	86.5	100.0	94.5	105.5	96.5

* Revised



• Superior finish that affords excellent adhesion and gives exceptional clearness to painted, decal and lithographed designs . . . Uniform gauge . . . Consistent forming qualities that make for easy, economical fabrication.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PENNSYLVANIA

100—THE IRON AGE, April 19, 1945

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Industry Anticipates Changes In Capitol Attitude Toward All of Industry

Washington

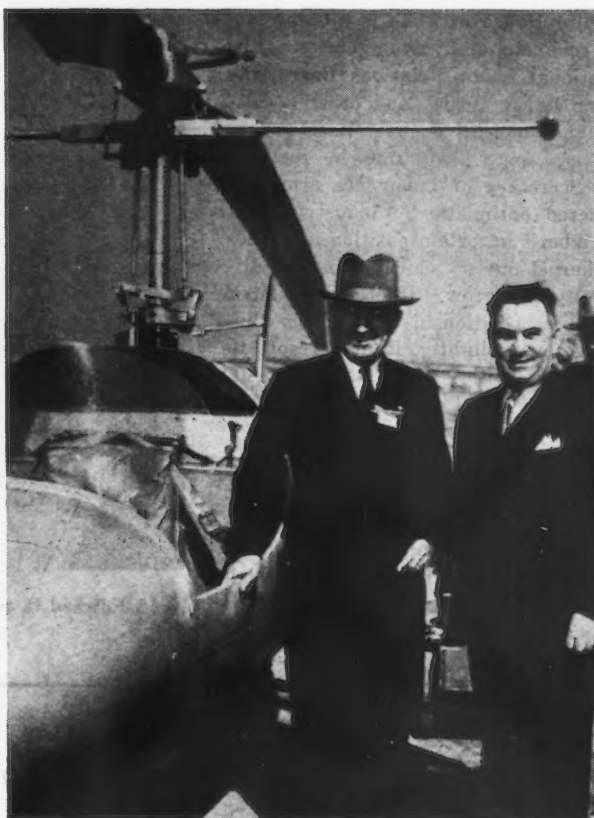
• • • Industry anticipated changes this week in the way it is regarded in Washington. The general feeling was that President Truman will pursue more of a middle of the road course than did Mr. Roosevelt in policy on regulations, labor and centralized control.

As the shock of the tragic Roosevelt death began to wear off and as Mr. Truman took hold of the manifold and pressing tasks of administering the nation in the midst of war, calm appraisal by top industrial analysts led to a growing belief that the New Deal, long withering, died with Mr. Roosevelt's passing, that even though many of its reforms will live on permanently and its temporary phases may be a long time in passing, the general trend is now away from the left. President Truman is not expected to take decisive action which will interfere with this very gradual swing.

On administration, the new President will necessarily decentralize. He is unfamiliar with many of the endless details which grew up during the war and which were so thoroughly in Mr. Roosevelt's mind, and he will have to hand specific jobs to specific men with specific authority much more than did his predecessor. That he will do this is indicated not only by the facts of the situation, but also by the Truman temperament as outlined by people who know him well.

One of those who may assume towering stature in the new arrangement is Secretary of State Edward R. Stettinius, Jr., who went to Washington from the chairmanship of United States Steel Corp. This industrialist can well become the nation's key figure in the making of the peace, if he continues at his post. As such he will be concerned from here on in international affairs alone, but as his influence grows it can be expected to interject itself into domestic affairs as well. Certainly as Cabinet sessions produce discussions on domestic matters, Stettinius can be expected to be heard from whenever industry affairs are concerned; and his viewpoints,

• • •
AIR-MINDED PRESIDENT:
In one of his last acts as Vice-President, Mr. Truman visited Buffalo and witnessed flights of new aircraft, including the Bell helicopter. At his side is Lawrence D. Bell, president of the firm.
• • •



therefore, may bear fruits of flavor most welcome to the American manufacturing community.

Mr. Truman has the benefit of his former positions as Senator and Vice-President. In these capacities he not only gained a splendid working knowledge of Congress but also cultivated its good will, an invaluable asset to any President.

While Mr. Truman's record shows that he supported the late President on domestic policies in large measure, he not infrequently turned in his vote with the more conservative group. At times Mr. Truman lashed out at big business, but this was generally in the heat of campaign when he was on the political hustings. By and large, he has been sympathetic toward business. He reflected this attitude, for example, by sponsoring an amendment in the Senate to the 1944 revenue measure which would have permitted war contractors to set up postwar reserves for reconversion. Mr. Truman lost that fight. In 1943 he voted against the CIO-originated and administration-supported bill to limit corporate salaries to \$25,000 a year. Similarly Mr. Truman voted against a bill requiring publicity on income tax returns.

He built up a reputation for hard-hitting criticism of defects in the

military program as chairman of the Senate Committee Investigating the National Defense. On the whole he was credited with a good job in this capacity. This was due to his selection of an able staff, a highly important essential which should stand him in good stead as President. The subjects of the committee's reports ranged widely from pointing out inadequacies in OPM's first priority system to military slips in procurement and the administration's slow start in reconversion.

One major phase of relationship which remains completely unclarified is the President's in relation to labor. Mr. Truman, it will be recalled, was nominated for the vice-presidency at Chicago with the backing of the AFL and lukewarm support from the CIO Political Action Committee, the latter developing only after it was obvious that Mr. Wallace could not be renominated. Labor's standing with the new President, therefore, may not be too firm, certainly far less firm than its place with Mr. Roosevelt.

This can be good and it can be bad, as industry sees it. It can be good in that labor, particularly the CIO—lacking White House support for its moves—may find itself checked all along the line when it strays from justifiable position; certainly the

White House attitude is all-powerful in such administrative agencies as the National Labor Relations Board, the War Labor Board, and others. Dispatches indicating that Miss Frances Perkins may likely soon be replaced as Secretary of Labor are also considered optimistic by industry. But in labor's uncertain position itself lies a kernel out of which industrial difficulty can grow. If organized labor feels its position in Washington slipping, even slightly, it may resort to pressure tactics to reestablish itself, and these could cause great hardship for industry.

In this respect, a good deal of the answer may be provided by President Truman's personal ambitions and appraisals. If he wants to continue as President for another term—which appears to be the natural development



Edward R. Stettinius, Jr.

in any first-time White House occupant—he may seek to court labor with favor. Then, if he appraises CIO, AFL and PAC as major factors in vote-getting (and, perhaps, balances them above the possibility of an indefinable amount of anti-union veteran voting) he may follow that intention with action. This entire sphere of development awaits opening.

Industry's wheels whirled this week in unbroken momentum as the front offices contemplated these problems. Only the future will tell the positive answers, but one positive affirmation overlaid all the thinking, the beliefs and disbeliefs and the theories—that the nation will continue as in the past, moving further over the long term on the upward road which democracy has built for itself for centuries up to the present day.

Senate Surplus Properties Group To Carry Out Machine Tool Hearings

Cleveland

• • • Approximately \$4,000,000,000 of machine tools and other metal-working machinery has been built for public and private use in this country, or for export in connection with the war production program. A large part of these tools and machinery will become surplus property at the termination of hostilities and will constitute a major disposal problem.

In an effort to completely evaluate this problem, Senator Tom Stewart, chairman of the Senate sub-committee on Surplus War Properties, has announced that public hearings on machine tool disposal will be held in Washington on April 25, 26, 27. These hearings will be participated in by private industry and Government.

Machine tool builders will be represented at the hearings by H. H. Peaze, president of the New Britain Machine Co., New Britain, Conn., and William P. Kirk, vice-president, Pratt & Whitney, West Hartford, Conn. Representatives of all machine tool users have been asked to be present.

The National Screw Machine Products Association, Cleveland, will be represented by Orrin B. Werntz, executive secretary, and Fred C. Phillips, president, F. C. Phillips Co., Stoughton, Mass., and R. D. Perry,

the Perry-Fay Co., Elyria, Ohio.

Senator Stewart has invited as witnesses the representatives of all metal-working trade associations and other machine tool users as will be spokesmen for captive plants which now use government machine tools for war production purposes.

Robert Hinckley, director of the Office of Contract Termination and representatives of the Smaller War Plants Corp., Surplus Property Board, and the Defense Plant Corp., have been requested to participate as witnesses.

War Production Board representatives have been asked by Senator Stewart to testify at these hearings in regard to the needs of machine tools for current and projected war production programs and have also been asked to furnish information as to the release of schedules of all machine tools now being used for war production.

All branches of the armed services and the Maritime Commission have been requested by the Senator to supply inventory figures on machine tools owned by the various branches of the armed services and statements of their postwar stand-by requirements.

J. B. Carswell, president, the War

Assets Corp., Ltd., Ontario, Canada, (the surplus property disposal agency for Canada) has accepted Senator Stewart's invitation to outline in detail the Canadian plan for machine tool disposal.

Ceilings on 15 Gal. Navy Drum Washington

• • • OPA has announced ceiling prices on 15 gal. steel buoyancy type drums that the Navy is selling for civilian use. The bases for these prices are those obtained from the sale of drums by the Navy at Boston. The drums are made from 18 gage steel.

Previously, ceilings were established on used buoyancy type drums of 55 gal. and 20 gal. capacity, when sold by the Navy, and on any subsequent resales.

The Navy's ceiling for 15 gal. drums "as is" is 50c. each. The ceiling for resellers of the drums "as is" is 70c. On sales of drums that are reconditioned, the ceiling is \$1.45. All three ceilings are fob shipping point.

To sell at the reconditioned price ceiling, the used drum must be thoroughly cleaned, de-dented, painted, fully repaired to insure that the drum is liquid tight, and be supplied with the necessary opening, closures and gaskets to make the drum fit for use as a shipping container.

VE-Day Steel Supply for Only Essentials With Existing Requirements

Washington

• • • Twice as much steel as the 1,500,000 tons expected to be freed by VE-Day cutbacks would have to be made available for unscreened requirements submitted by nonmilitary agencies at WPB's request. Not only does this mean that civilian claimant agencies' increased demands cannot be met for such essential programs as the railroads, utilities, and petroleum production, but it means that there will not be a pound of free steel.

All nonmilitary agencies submitted tentative third quarter one-front war requirements for carbon steel assum-

ing immediate military cutbacks of 9 per cent. Agencies turned up with total requirements of 3,000,000 tons which was pared by the requirements committee to 2,000,000 tons.

On this basis OWMR decided that prospective demand on steel supply for bare essentials in the post VE-Day quarter would make it dangerous to war production material requirements to permit CMP to become "open end." The open ending of CMP is not planned until the second quarter after VE-Day and when allowed would permit producers to accept civilian orders above military allotments received.

Under these plans, only 252 tons of steel will be allotted for passenger car production in the quarter after Germany's defeat. WPB estimates that 300,000 would be the minimum automobile industry requirement in this period if automakers are to be allowed to break even.

However, the succession of Harry S. Truman to the Presidency has given rise to speculation among WPB officials that VE-Day cutbacks may be as high as 33 per cent, with as much as a 50 per cent cutback within the first six months after VE-Day.

These speculations are based upon attitudes he expressed as Senator, and if accurate will call for drastic revision of all present plans for cutting back war production.

Alabama Coal Strike Slashes Production Rates of Iron and Steel

Birmingham

• • • With Alabama's coal mine strike unsettled as of Monday night, further cutbacks had been made in pig iron and steel production in the Birmingham district, and for the current week open hearth steel production in the district is estimated at 49 per cent, lowest in many years.

The Tennessee Coal, Iron & Railroad Co. now has four blast furnaces down at Ensley, and has shut down open hearth operations there. Normally the company has seven furnaces on at Ensley.

With two blast furnaces off at Fairfield Works the Tennessee company still has its eight normally active open hearths on there but is using heavy scrap charges. The Tennessee company estimates that it is losing 4500 tons of steel ingots a day and about 4900 tons of pig iron. In addition, the company has closed down its rail mill at Ensley as well as the finishing mill there, and says a shutdown of the Fairfield plate mill, structural mill, and cotton tie mill is threatened.

Republic, with one blast furnace at Gadsden still down, is reported to be operating seven out of eight open hearths at Gadsden, but no official figures on ingot production are available.

Meanwhile, in the coal fields, the picture was spotty with some companies operating their mines and others, like the Tennessee company, having no miners at work. William Mitch, president of District 20, UMW, said:

"There is no reason on earth why the men still idle have not returned to work. The contract has been signed and the international union has ordered the men back to work."

Lt. Col. Peterka To Act As Consultant In Defense Plant Corp.

Cleveland

• • • Lt. Col. A. E. R. Peterka, assistant chief of the Readjustment Division of the Army Air Forces' Air

Technical Service Command, Wright Field, Dayton, Ohio, has been relieved of active duty, with reversion to inactive status, so that he may serve as consultant to the Defense Plant Corp., subsidiary of the Reconstruction Finance Corp. at Washington, D. C., it was announced recently.

Colonel Peterka's services for the Surplus War Aircraft Division, an organization set up by the DPC to dispose of surplus aircraft components and parts, were obtained through a request to the War Department by ex-Senator Charles B. Henderson, chairman of the board of the RFC.

Formerly executive engineer of the Lamson & Sessions Co. here, Colonel Peterka was called to active duty in July 1942, and served as chief of the Materiel Distribution Branch until February 1944. He was then made chief of the ATSC Property Disposal Staff and in August 1944, was appointed assistant chief of the Readjustment Division under Brig. Gen. E. W. Rawlings, from which post he leaves for his new duties in Washington.

While stationed at Wright Field, he developed a plan for redistribution of surplus aircraft material through regular commercial channels, and the "Peterka Plan" is now known as the Metals Reserve Redistribution Program. Before leaving for active duty in the AAF, Colonel Peterka, who is the author of a number of technical articles dealing with metallurgy, was elected chairman of the Cleveland Chapter of the American Society for Metals.



Lt. Col. A. E. R. Peterka

Canadian Aluminum President Claims Orders Due to Coal, Manpower Shortages

Montreal

••• New orders for 250 million lb. of aluminum ingot to come from the Aluminum Co. of Canada are an indirect result of coal and manpower shortages in the United States, President R. E. Powell of the Canadian firm told THE IRON AGE following a Senatorial investigation of the new contract in Washington last week.

The new and earlier contracts to purchase aluminum from Alcan attracted Senatorial curiosity last week

For further information on the development of Canada's aluminum industry see THE IRON AGE, April 5, 1945, p. 113.

following complaints by R. S. Reynolds, president of Reynolds Metals Co., before the Senate Small Business Committee, that his firm has been discriminated against in favor of the Aluminum Co. of Canada. To his complaints were added the righteous indignation of Senator Guy Cordon of Oregon, where presently idle American light metal plants are located.

It was asserted in the testimony that the orders could have been placed in plants in the Pacific Northwest, re-opening the shut-down plants there. Representatives of the Bonneville and Grand Coulee power developments

stated that priorities granted for the development of power in the Saguenay river region in Canada would have permitted greater expansion of facilities in the Northwest, aiding American industry.

WPB officials called to testify at the Washington hearings defended the placement of the contracts, as well as denying that they had discriminated against any American producer. William L. Batt, vice-chairman of the WPB, and a high official in the OPM, stated that the contracts, present and past, had been based on the military necessity to get as much aluminum as possible, as quickly as possible, and that considered from this standpoint, the government had made a good bargain.

According to Mr. Powell, the new contract, for deliveries following the completion of existing ones on July 1, was accepted by his firm with mixed emotions, including some reluctance. His firm is known to be operating within the 100 per cent excess profits tax bracket under Canadian law. Reductions in personnel were underway at Arvida, where the principal works are located, and must now be reversed.

It is presently estimated that from

1000 to 1500 workers must be rehired. The unusual labor picture in the district, however, will make the manpower comparatively easy to locate. In a district where aluminum and pulpwood are the only industrial products, men laid off at the potlines "go into the bush" in the winter months to cut lumber for pulp, and then eke out a bare existence on farms in the summer months. Much of this labor with the passing of the lumber in the spring floods will become available.

Present estimates are that from a low production of about 35 per cent of capacity, the Canadian lines will be upped to a peak of 68 per cent in fulfilling the new contract.

In connection with his explanation of why the contracts went to Canada, rather than the United States, Mr. Powell explained that most of the hydro-electric power used in the Pacific Northwest to produce aluminum is so located that it can be utilized in some way to save coal. In contrast, he stated the location of the Shipshaw plant is such that it has been wasting water constantly in the past months, in fact, within the past two weeks the equivalent of a million hp. has been wasted. He added, that this is, of course an abnormally large figure due to the swollen condition of the streams.

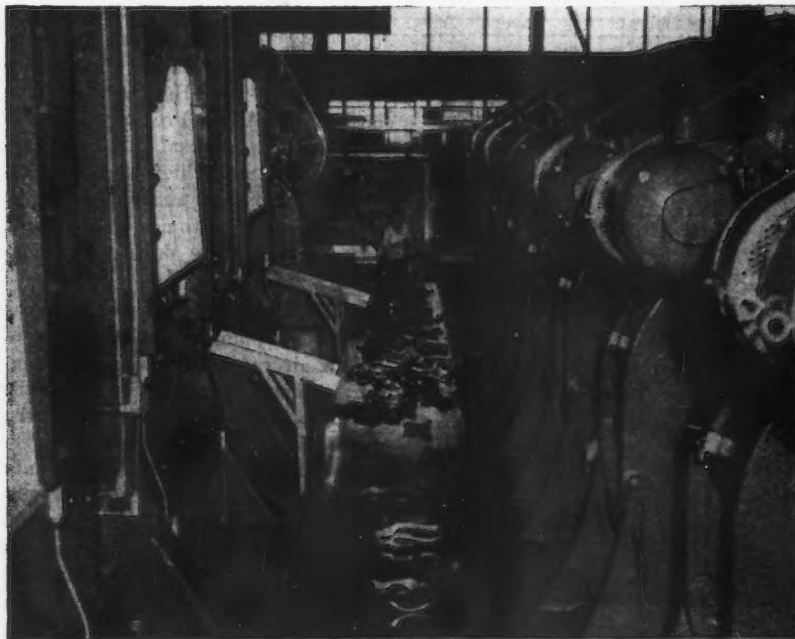
Loss Determination Clarified

Washington

••• Director of Contract Settlement, Robert H. Hinckley, recently issued Amendment No. 1 to OCS Regulation No. 14 which establishes the method for determining the amount of loss on special facilities that contractors may include as costs in termination settlements. The new termination cost memorandum makes provision for the allocation to a terminated contract of that part of the cost of a special facility which is applicable to the terminated portion of the contract. This may be measured by unit quantities of deliveries or some other equitable basis. Where the special facility is sold to a third party or retained by the contractor the termination claim must reflect the appropriate disposal credit.

A special facility is defined in the memorandum as "a facility acquired by the contractor solely for the performance of the contract, or for the contract and other war production contracts, which is not of the same type or utility as those used in the contractor's other business."

AIRCRAFT PARTS: Press formed aircraft parts at the Louisville, Ky., plant of the Reynolds Metals Co. fall directly from the machines on a conveyor and are moved to packing cases.



Pershing Tank and Its Successor Shown by Army Along with Other Weapons

Washington

• • • Lifting the veil of secrecy surrounding many new Army developments for the first time, the Army Service Forces staged an on-the-record show at Fort Myer, Va., on April 10, which brought out into the open many of its latest weapons, most of which were completed within the past six months.

The highlight of the show was the unveiling of the new "General Pershing" tank, now standardized as the M26, and the revelation that a newer improved model of this tank, dubbed the T26E4, has already been turned out and has undergone extensive tests.

The M26 is equipped with 4 in. armor in front, as compared with 3 in. armor on the "General Sherman" tank. Armor on the rest of the tank is about 1 in. thick. The tank weighs 43 tons bare, and about 44½ tons fully loaded.

It is powered by a Ford V-8, liquid-cooled, gasoline engine, which develops 500 hp. Equipped with a fluid drive mechanism and torsion bar suspension, its ride is said to be smoother than in other tanks. The General Pershing carries a crew of five and has dual controls.

Its armament consists of a 90 mm. gun, two 30 cal. machine guns and one 50 cal. machine gun, and it is capable of carrying 70 rounds of 90 mm. ammunition.

Another innovation is the guide in the center of the bogie wheels. The guides of the bogie wheels of the General Sherman are on the outside edges. In addition, the bogie wheels on the M26 are larger and the rubber is heavier.

Featuring a 24-in. track as compared with a 16-in. track on the General Sherman, the M26 can move faster on soft terrain.

The primary differences in the T26E4 are in the armament. The 90 mm. gun on this newer development has a muzzle velocity of 3750 ft. per sec., as compared with 3200 ft. per sec. on the M26. This is achieved by using a larger shell. The armor-piercing shells carried by these tanks and bearing a tungsten carbide core, the Army states, can penetrate 14-in. armor at 300 yd.

The T26E4 is equipped with twin 50 cal. machine guns on a freer swinging mount than the one 50 cal. gun carried by the M26. It is also equipped with two 30 cal. machine guns.

The width of both tanks is 134 in.

The M26 is being produced by the Fisher tank arsenal of GM and the Detroit tank arsenal of Chrysler.

The M26 is in production and is in use in Europe. The T26E4 has not yet reached the production stage, but has been run over 4000 miles in initial testing.

Also featured at the show was the newest Army floating pontoon bridge, the M4, developed by the Corps of Engineers, primarily to carry the M26 tank.

Of much interest was the large number of smaller new items in which light metals had been substituted to achieve greater mobility.

Already in limited procurement is the new armor vest, T46, constructed of 24ST aluminum alloy and backed up by nylon duck. The old vest was made of manganese steel and while still in use the newer vest is expected to become standard Air Corps equipment. Another innovation is the new crotch armor, designed to protect troops from anti-personnel mines, also made of the aluminum alloy.

An improvement on the bazooka is Ordnance's new rocket launcher, the M8, in which aluminum tubing is used rather than steel, thus achieving a saving of 5 lb. in weight.

The war head of the robot bomb, JB2, is constructed of aluminum alloy plate, ¾ in. thick, and weighs 2000 lb. fully loaded with explosives.

The aluminum food carrier developed by the Quartermaster Corps weighs only 16 lb., but is of the same capacity as the old carrier which weighed 41 lb. Since much of this smaller equipment can be either carried as a single unit or broken down on the Quartermaster pack board weight saving is a prime factor when new developments are being considered.

Perhaps the newest device to be shown was the Corps of Engineers "snake" mine clearing device. This piece of equipment consists of a magnesium alloy tube containing an explosive charge. This tube is scooted out into a mine field by a small rocket motor, and is detonated by a nylon cord which is fastened to a stake, bayonet, or any other stationary object in the ground. When the full length of the cord is run out the charge will go off exploding all mines within a large radius.

This show, one of several that have been held, was the first that was open to the press, and the equipment shown clearly indicates the intention of the Army to throw everything possible at the Japs. The Army claimed credit for most of the developments, but the Office of Scientific Research and Development and the Inventor's Council were credited with some of the work.

HALF-TRACK MEN: One of the final steps in half-track construction is shown here in the curing room, where molds designed and built specifically for half-tracks heat the rubber to a temperature of almost 300 deg. for two hours.



Prefabricated Homes Reported Ready to Come Off Assembly Lines

New Albany, Ind.

• • • Out in New Albany, Ind., just across the river from Louisville, Ky., Foster Gunnison, president of Gunnison Homes, Inc., has set up what may be referred to in years to come, the "cradle of prefabricated housing." For four long years now he has been unable to build his Gunnison home, but in that time has worked hard to develop a selling technique. Prior to that time, from 1934 to 1941, he proved the worth of his product.

The Gunnison home is ordered from catalog, panel by panel, and is erected on the job. There are various styles of 4 x 8 ft. wall panels as well as floor, ceiling, roof and gable-end panels, all factory assembled. Exterior and interior finishes are components of each outside panel, as well as the studding and joists. Every home is designed from a standardized panel chart showing the panels that can be produced, and from these panels eight different homes can be designed. Basically, the chief material is plywood. Wall panels are bonded with resorcinol phenol formaldehyde, a thermosetting resin that gives the panels a plastic-like finish that is highly impervious to wear and stain.

The production technique, Gunnison officials are proud to admit, is copied from auto assembly technique, but is obviously much more simple. The wall-panel conveyor carries the material through the various assembly and finish stations to completion; and all other conveyors are synchronized

to the wall panel speed of 16 ft. per minute. This speed yields a complete house every 25 minutes.

By the use of left and right hand plans, there are actually 16 floor plans. For further variety, Gunnison offers front and back porch packages, arcade packages, and garage packages. There is also a wing package that can be used to add four feet (the width of Gunnison panels) to any corner room. The arrangement of these parts gives a great deal of variety of form.

Behind the whole Gunnison plan is the driving force of Foster Gunnison. He developed this method of mass production of homes. His right hand man is Dr. Lawrence G. K. Lindahl, an industrial psychologist. Through the efforts of Dr. Lindahl and Gunnison officials, the Gunnison Homes Institute was formed and officially opened in Feb. 5 to train personnel. It worked so well that outsiders have been coming, upon invitation, to this school to learn the why's and how's of prefabricated housing.

Mr. Gunnison is a showman. He has a good product for his chosen market of the \$25 to \$50 per week wage earners—not revolutionary, but good. He has done a job far superior to that of his competitors in designing and setting up a product as well as a marketing and distribution plan. His postwar plans are definite, but a bit "sky blue," especially in regard to what he intends to put into his prefab house.

He has worked long and hard in

instilling enthusiasm into his organization, especially difficult since he has nothing to sell now. In fact, the enthusiasm is overdone. At his institute, a crew of highly trained specialists reeled off a prefabricated, "I'll tell you what I'm a goin' to do" patter. Their fast answers to all questions were a bit too pat—superficial and again prefabricated answers that were fast and smooth, completely overwhelming the questioner with words.

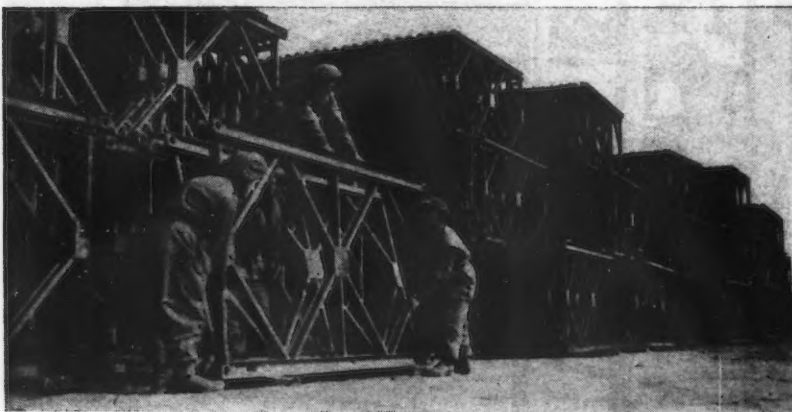
Architects were damned as were building supply people, manufacturers, and, in general, everyone connected with conventional type house construction. Gunnison said their entire concept was wrong, too costly, misleading to the consumer, and antiquated.

There is little doubt that Gunnison is going in the right direction in home building. Prefabricated housing is really just beginning. Mr. Gunnison roughly estimates that in 10 years, 40 per cent of home building will be prefabricated. He is optimistic, but he knows he has a good product, a highly enthusiastic organization, good financial backing, and a "home starved" public for a market. The cost differential between the conventional and his prefabricated house is not too great—maybe not great enough. He is hesitant to increase that span, feeling that more should be put into the house rather than the unit price be cut.

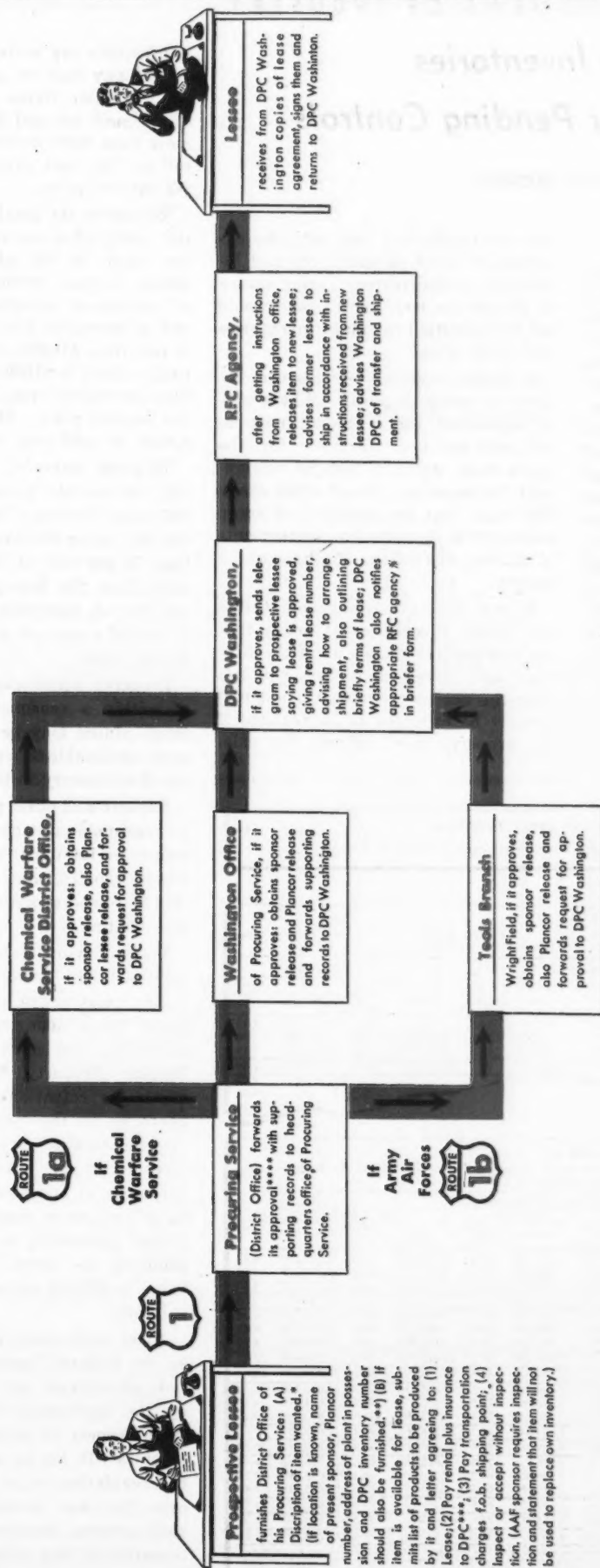
Interest is being attracted by Gunnison. Prospective dealers are flocking to New Albany to see how they can fit into the picture. An unusual amount of interest is being displayed by department stores. Abraham & Straus had its crack merchandising man, the well-known Jimmy Ginsberg, down to see how A & S could handle the distribution of the Gunnison home. Joseph Horne Co., Pittsburgh, J. L. Hudson Co., Detroit, and other department stores, are showing more than casual interest.

Mr. Gunnison hopes that quickly after the war ends, he will be able to set up about 10 plants throughout the country to serve all markets. Being a U. S. Steel Corp. subsidiary, the financial backing is assured. Incidentally, both Mr. Gunnison and U. S. Steel officials claim that there will not be a quick redesign to use steel. Steel will be used, but only after production gets underway and steel is proved to be the best material that can be found for any specific use.

RHINE ASSAULT: Royal Engineers stack part of a huge number of Bailey Bridge panels to be used in the Rhine crossings. This was only a fraction of the great build-up of material stored on the West bank of the river before a crossing was attempted.



HOW TO OBTAIN DPC-OWNED MACHINE TOOLS OR EQUIPMENT UNDER A "RENTRA" LEASE



*Final approval of sponsoring service may be contingent upon a survey of the prime's needs based on actual urgency and military end use.

**If contractor does not have all the detailed information needed, he can obtain it from the District Office of the Procuring Service or his local RFC office.

***"Rentra", lease is made with DPC at 1% a month plus insurance based on original cost (insurance equals four cents for each \$100 per month), with no option to buy and with sponsor controlling end use of equipment. Lessee must agree to keep machines in good condition and repair.

Equipment may be placed for each end product in any plant other than that of a present Plancor under a "Renta" lease.

****Company must demonstrate need to the satisfaction of the sponsoring service before approval is granted.

*RFC Agency may be either at the Washington or local level depending on circumstances.

This chart was prepared from data obtained by the Automotive Council for War Production, Detroit.

Sale of Termination Inventories To be Limited Under Pending Controls

By DONALD BROWNE

Washington

••• The Surplus Property Board will issue within the next 30 days a stringent regulation controlling the sale of termination inventories which will supersede present regulations. Differing from the Joint Termination Regulation now in effect, it provides that the RFC will take over material and machinery inventories not wanted by contractors or which contractors will not be permitted to retain because of the probable scarcity of such items or because the contractor is a big one.

New requirements for advertising for bids and more reviews of sales of serviceable property and scrap, together with lowering of the limitation on allowable sales of small lots from \$2500 to \$300, are some of the provisions.

Owning agencies would be permitted to freely sell termination inventories

for war production, but, with the exception of sales of small lots and inventories of contractors having claims of \$10,000 or less, contractors would not be permitted to retain inventories and resell them.

A similar situation prevails with respect to scrap disposal. Where sale is negotiated for scrapped material and bids are not advertised for, the buyer must warrant that he will remelt the material. In all other cases, SPB says that the inclusion of scrap warranty in termination agreements is at the discretion of the owning agency.

In new price provisions, contractors may retain inventories at prices that are fair and reasonable as of the time they are agreed upon and not less than the net proceeds that could reasonably be expected to be realized if the property were offered for sale.

Contractors are permitted, where the sale of any item or group of substantially similar items in inventory is of a small lot and does not involve more than \$300 worth of property, to sell at "the best price obtainable" or the market price.

Whenever the total of the termination claim of a contractor (excluding the claims of his subcontractors and before disposal credits), plus the cost of completed articles not delivered and government furnished equipment is less than \$10,000, or the net termination claim is \$1000 or less, termination inventories may also be sold at the market price. Machinery or materials so sold may be resold.

Disposal agencies are directed to sell serviceable property under the following formula: "Sales shall be at the best price obtainable, but not less than 75 per cent of the cost or of the price that the buyer would have to pay for an equivalent quantity from a normal source of supply, whichever is the lower."

Property which cannot be disposed of within a reasonable time on the terms stated may be sold at the best price obtainable to any buyer who will use the property in the United States.

Salvage and other property that has no reasonable prospect of sale for use either in its existing form or after minor repairs, and scrap are to be sold by disposal agencies by competitive bidding.

The following transactions must be reviewed: 1—Pretermination agreements relating to contractor inventories by a departmental reviewing authority, and upon request by the Surplus Property Board; 2—agreements for retention of contractor inventories by the owning agency; 3—classification of property as unserviceable by an agency, in any one inventory at one place when cost was \$25,000 or more, must be reviewed by proper authority; 4—classification of property as scrap when estimated value is \$25,000 or more by RFC consultants.

After publication of the regulation in the Federal Register, pretermination agreements are to be governed by the provisions of the regulation. With respect to property which contractors will not be allowed to retain, the regulation says: "In no case except for war production purposes, shall owning agencies authorize the retention of any category or item of contractor inventory in short supply."

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1945

Based on Reports by Companies which in 1944 made 97.1% of the Open Hearth, 100% of the Bessemer and 84.2% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent capacity		
January	6,468,814	90.5	379,062	76.0	356,427	76.8	7,204,303	88.8	1,626,255	4.43
*February	5,967,842	92.4	347,227	77.1	337,731	80.6	6,652,800	90.8	1,663,200	4.00
†March	6,937,797	97.0	398,392	79.8	388,567	83.8	7,724,756	95.2	1,743,737	4.43
1st Quarter	19,374,453	93.3	1,124,681	77.6	1,082,725	80.5	21,581,859	91.6	1,678,216	12.86
April										4.29
May										4.43
June										4.29
Total										4.29

YEAR 1944

Based on Reports by Companies which in 1943 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.9% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,769,438	97.2	439,551	85.4	377,751	83.3	7,586,740	95.6	1,712,582	4.43
February	6,409,981	98.4	409,781	85.2	368,555	87.0	7,188,317	96.9	1,736,308	4.14
March	6,976,450	100.1	455,368	88.5	388,408	85.7	7,820,226	98.5	1,765,288	4.14
1st Quarter	20,155,869	98.6	1,304,700	86.4	1,134,714	85.3	22,595,283	97.0	1,738,099	13.09
April	6,788,433	100.6	437,472	87.8	362,118	82.5	7,588,023	98.7	1,768,770	4.20
May	6,878,251	98.7	437,444	85.0	380,960	84.0	7,696,655	97.0	1,750,394	4.43
June	6,462,108	95.8	419,699	84.2	347,028	79.0	7,228,835	94.1	1,685,043	4.31
2nd Quarter	20,128,792	98.4	1,294,615	85.6	1,090,106	81.9	22,513,513	96.6	1,734,478	13.01
1st 6 months	40,284,661	98.5	2,599,315	86.0	2,224,820	83.6	45,108,796	96.8	1,730,487	36.01
July	6,742,830	96.5	415,543	80.9	334,710	73.7	7,493,083	94.2	1,695,268	4.42
August	6,714,857	95.9	429,672	83.5	348,901	76.6	7,493,430	94.0	1,691,519	4.33
September	6,500,997	96.1	398,058	80.0	330,837	75.2	7,229,892	93.9	1,689,227	4.28
3rd Quarter	19,958,684	96.2	1,243,273	81.5	1,014,448	75.2	22,216,405	94.1	1,692,034	13.13
9 months	60,243,345	97.7	3,842,588	84.5	3,239,268	80.8	67,325,201	95.9	1,720,112	39.14
October	6,859,922	98.0	420,105	81.6	335,526	73.7	7,615,553	95.6	1,719,086	4.43
November	6,571,497	96.9	403,908	81.0	298,503	67.7	7,273,908	94.3	1,695,550	4.29
December	6,677,488	95.6	373,323	72.7	310,380	68.3	7,361,191	92.6	1,665,428	4.12
4th Quarter	20,108,907	96.9	1,197,336	78.4	944,409	69.9	22,250,652	94.1	1,693,353	13.14
2nd 6 months	40,067,591	96.5	2,440,609	80.0	1,958,857	72.6	44,467,057	94.1	1,692,693	26.27
Total	80,352,252	97.5	5,039,924	83.0	4,183,677	78.0	89,575,853	95.4	1,713,293	60.29

Note—The percentages of capacity operated are calculated on weekly capacities of 1,572,735 net tons open hearth, 116,182 net tons Bessemer and 182,540 net tons electric ingots and steel for castings, total 1,791,387 net tons; based on annual capacities as of Jan. 1, 1944 as follows: Open hearth 82,223,610 net tons, Bessemer 8,974,000 net tons, Electric 8,510,180 net tons. Beginning July 1, 1944, the percentages of capacity operated are calculated on weekly capacities of 1,502,042 net tons open hearth, 116,182 net tons Bessemer and 182,787 net tons electric ingots and steel for castings, total 1,790,981 net tons; based on annual capacities as follows: Open hearth 82,564,500 net tons, Bessemer 8,974,000 net tons, Electric 8,572,180 net tons.

Machinery Surplus Sales Up; Surplus Light Metal Plants Are Listed

Washington

••• The disposal of surplus metalworking machinery, including production equipment and machine parts, in February reached \$4,160,000, compared with \$4,143,000 in January, despite the requests of the War and Navy Departments for the discontinuation of the sale of certain types of surplus machine tools, according to a report from the Surplus Property Board.

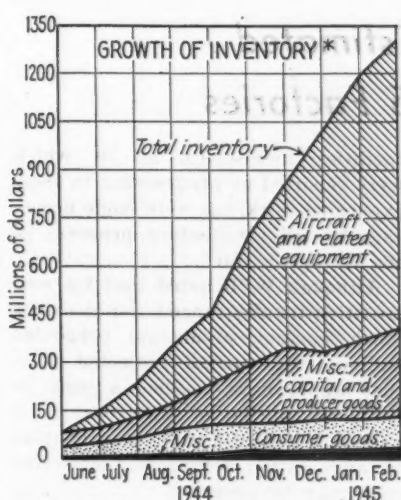
Sales of machine tools, the principal class of machinery, declined somewhat in February, as indicated by the following figures:

	Number	Cost	Price
November	468	\$1,492,000	\$ 887,000
December	1069	3,877,000	2,090,000
January	967	3,694,000	1,970,000
February	686	3,306,000	1,809,000

Declarations received from the owning agencies have continued to be large, amounting to \$13,720,000 in February as compared with \$13,602,000 in January. In view of large declarations, inventories increased \$9,560,000 during February to \$74,264,000. Based on February operations, the disposal of metalworking machinery requires an average of 17 months. Among the principal items in inventory at the end of February were lathes (\$11,724,000), mechanical presses (\$9,647,000), boring machines (\$6,950,000), milling machines (\$6,097,000), and heat treating furnaces and devices (\$5,505,000).

Among the large individual sales of metalworking machinery in February were the following: Fifty-nine machines with a reported cost of \$209,000 sold to the Easy Wash Machine Corp. for \$131,000; 132 machines with a cost of \$374,000 sold to the Bloomfield Tool Corp. for \$198,000; four milling machines with a cost of \$108,000 sold to the Firestone Tire & Rubber Co., for \$65,000 and 25 lathes with a cost of \$446,000 sold to the Navy Bureau of Ordnance for \$263,000.

On March 24, the Surplus Property Board approved the proposal of the DPC providing for the disposal of surplus cutting tools by the original producing manufacturers acting as agents of the government. The agency contract, to be offered to 235 manufacturers, requires the manufacturer to meet 25 per cent of his orders for cutting tools from the government surplus stock, thus permitting him to



* Reported cost or appraised value of property

SURPLUS INVENTORY: For all disposal agencies, machine tools are taken with other capital goods.

meet 75 per cent of his postwar sales from the production of new tools.

On March 15, the RFC had 80 surplus and excess plants and plant sites with an aggregate reported cost of \$552,474,000. Of these 23 projects were standby plants with a reported cost of \$408,203,000, 46 others with a cost of \$93,637,000 were facilities that had been declared surplus, and the remaining 11, with a cost of \$50,634,000, consisted of plants that were being used as disposal center warehouses, or for which operating agreements had been terminated or were pending termination. The following tabulation groups these excess and

surplus plants and plant sites according to size:

Size	No.	Total Reported Cost
Under \$1,000,000	42	\$ 11,402,000
\$1,000,000-\$4,999,999	15	37,894,000
\$5,000,000 and Up	23	503,178,000
Total	80	\$552,474,000

All the larger plants (over \$15,000,000) are aluminum and magnesium plants:

Operator	Cost	Product
Basic Magnesium, Inc., Las Vegas, Nev.	\$133,428,000	Magnesium
Dow Magnesium Co., Vefasco, Tex.	54,885,000	Magnesium
Mathieson Alkali Works, Inc., Lake Charles, La.	47,011,000	Magnesium
Aluminum Co. of America, Baton Rouge, La.	25,903,000	Alumina
Aluminum Co. of America, Los Angeles, Cal.	24,750,000	Aluminum Reduction
Dow Magnesium Co., Marysville, Mich.	23,586,000	Magnesium
Aluminum Co. of America, Massena, N. Y.	19,700,000	Aluminum Smelting
Dow Magnesium Co., Ludington, Mich.	18,450,000	Magnesium Chloride
Aluminum Co. of America, Burlington, N. J.	17,357,000	Aluminum Smelting
Electro Metallurgical Co., Spokane, Wash.	16,173,000	Magnesium
Total	\$381,243,000	

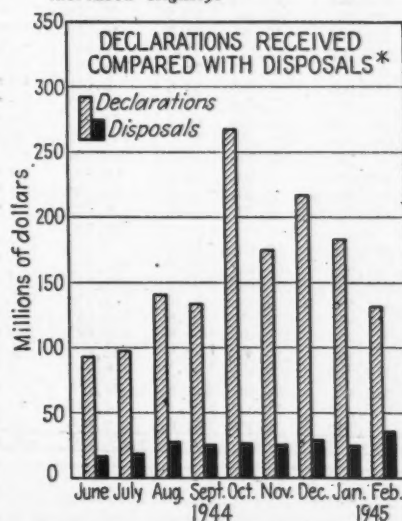
Ceilings for Journal Bearings

Washington

••• OPA has established dollar-and-cent ceiling prices effective May 1, for broached railroad car journal bearings, 6 in. x 11 in. and under, with ¼ in. lining. Bearings of the sizes for which ceilings were provided are babbit-lined copper base alloy castings made in accordance with Association of American Railroads Specification E-M-511-43 and are used principally for replacements in the maintenance of railroad cars and other rolling stock.

For straight sales of the bearings, involving no exchange of metal, the new ceilings are 18.65c. per lb. fob producer's plant in quantities of 7500 lb. or more, and 18.65c. per lb. plus the seller's quantity differential for quantities of less than 7500 lb. For sales of bearings in which the producer receives scrap metal from the buyer under a conversion or toll agreement the new ceilings are 18.40c. per lb. fob producer's plant, including a maximum conversion or toll charge of 5.91c. per lb. where the old bearing is returned with lining and 18.90c. per lb. including a maximum conversion or toll charge of 8.03c. per lb. where the old bearing is returned without lining.

PROPOSALS OF SUPPLIES: While the declarations for all agencies were declining in February, sales increased slightly.



* Reported cost or appraised value of property

Ammunition Cutback Estimated At \$550 Million in 75 Factories

Washington

••• The WPB Production Readjustment Committee on April 13 issued a list of plants affected by the halting of light artillery ammunition facilities, announced in Chicago by the Army on April 11.

Official estimates are that the cancelling of contracts for construction and new equipment may be \$200,000,000 directly for facilities, and perhaps a total of \$350,000,000 when all components terminations are considered.

WPB said that facilities affected were either in an expansion stage or adding new production equipment to meet the anticipated increases, so that the change will not result in any labor releases other than minor ones of persons engaged in construction work. The curtailments do not reflect on the

facilities themselves, all of which were reported as progressing in their expansion work, but were made necessary by the satisfactory progress of the European war.

Although WPB noted that the ammunition facility cancellation does not touch current production schedules but will only curtail projected rates that would have reached a peak in the last quarter of the year, it is understood that further cancellation of ammunition contracts themselves soon may be expected.

The list of 75 plants directly affected by the revision of schedules follows:

Forging for Shell, 75mm

Bonney Forge & Tool Works, Emmaus, Pa.
Cole Engineering Co., Blanchester, Ohio.

National Supply Co., Washington, Pa.
Rheem Mfg. Co., Bessemer, Ala.

Shell, 60mm

Flannery Bolt Co., Bridgeville, Pa.
Louis Marx Co., McMechen, W. Va.
Railway Industrial Engineering Co., Greensburg, Pa.
Fletcher Enamel Co., Dunbar, W. Va.
Hays Mfg. Co., Erie, Pa.

Forgings for Shell, 60mm

Continental Can Co., McKees Rocks, Pa.
Lehigh Foundry Co., Easton, Pa.
Firestone Steel Products Co., Akron.

Fuse, M 48

Bigelow-Sanford Carpet Co., Amsterdam, N. Y.
Technifinish Laboratories, Rochester.
E. G. Budd Mfg. Co., Bustleton, Pa., and Philadelphia.
Hoover Co., Massillon, Ohio.
Wright Automatic Machine Co., Durham, N. C.
Nineteen Hundred Corp., St. Joseph, Mich.
Bowser, Inc., Ft. Wayne, Ind.
Ballard Aircraft, Arthurdale, W. Va.
McEvoy Industries, Houston.
National Cash Register Co., Dayton.
Remington Arms, Denver.
Globe Holst Co., Des Moines.

Shell, 105mm

General Railway Signal Co., Rochester.
Pullman Standard Car Co., Hammond, Ind.

AMERICAN IRON AND STEEL INSTITUTE CAPACITY, PRODUCTION AND SHIPMENTS											
Period: FEBRUARY - 1945											
Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month				To Date This Year			
				Production		Shipments (Net Tons)		Production		Shipments (Net Tons)	
				Net Tons	Per cent of capacity	Total	To members of the industry for conversion into further finished products	Net Tons	Per cent of capacity	Total	To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	47	1	xxxx	xxxx	xxx	698,385	156,647	xxxx	xxx	1,395,768	351,392
Structural shapes (heavy)	12	2	9,580,550	262,982	38.1	261,688	xxxx	520,680	36.1	520,398	xxxx
Steel piling	3	3		17,292		18,745	xxxx	38,616		38,545	xxxx
Plates (sheared and universal)	27	4	17,841,320	712,959	52.1	713,634	49,724	1,520,755	52.7	1,501,480	94,681
Skelp	6	5	xxxx	xxxx	xxx	58,475	29,481	xxxx	xxx	115,996	77,549
Rails—Standard (over 60 lbs.)	4	6	3,669,000	178,286	63.3	179,758	xxxx	371,475	62.6	364,082	xxxx
—All other	5	7	512,000	13,362	34.0	13,982	xxxx	28,023	33.9	28,557	xxxx
Splice bars and tie plates	12	8	1,745,960	59,711	44.6	62,998	xxxx	124,348	44.1	128,605	xxxx
Track spikes	10	9	349,400	11,767	45.9	11,765	xxxx	25,123	44.5	25,539	xxxx
Hot Rolled Bars—Carbon	35	10	xxxx	689,531	xxx	540,703	75,738	1,405,083	xxx	1,085,319	168,863
—Reinforcing—New billet	15	11	xxxx	44,982	xxx	44,464	xxxx	102,433	xxx	97,271	xxxx
—Rerolled	13	12	xxxx	2,558	xxx	9,731	xxxx	10,922	xxx	14,078	xxxx
—Alloy	24	13	xxxx	246,988	xxx	178,377	15,787	518,744	xxx	378,748	40,942
—TOTAL	45	14	22,201,700	981,059	57.6	773,275	91,525	2,037,212	56.8	1,575,416	209,805
Cold Finished Bars—Carbon	25	15	xxxx	135,824	xxx	138,534	xxxx	286,558	xxx	285,053	xxxx
—Alloy	24	16	xxxx	37,044	xxx	34,408	xxxx	74,602	xxx	67,281	xxxx
—TOTAL	31	17	2,964,910	172,868	76.0	172,942	xxxx	361,160	75.3	352,334	xxxx
Tool steel bars	17	18	273,010	10,990	52.5	10,787	xxxx	22,154	50.2	22,346	xxxx
Pipe and Tubes—Butt weld	16	19	2,165,520	101,199	60.9	95,566	xxxx	214,340	61.2	205,269	xxxx
—Lap weld	8	20	830,200	32,928	51.7	30,019	xxxx	78,228	58.3	73,686	xxxx
—Electric weld	11	21	1,380,900	71,177	67.2	70,232	xxxx	150,439	67.4	146,667	xxxx
—Seamless	15	22	3,004,100	181,853	78.9	195,567	xxxx	385,903	79.5	393,357	xxxx
—Conduit	7	23	187,000	4,816	35.6	6,014	xxxx	12,205	40.4	13,459	xxxx
—Mechanical tubing	12	24	1,151,800	67,258	77.5	65,484	xxxx	138,729	75.8	133,345	xxxx
Wire rods	27	25	7,266,670	346,254	62.1	95,965	29,946	744,692	63.4	197,952	69,833
Wire—Drawn	41	26	5,664,690	285,454	65.7	175,022	9,298	610,102	66.6	357,713	19,223
—Nails and staples	19	27	1,253,360	47,746	49.7	48,194	xxxx	100,089	49.4	97,046	xxxx
—Barbed and twisted	15	28	539,610	18,590	44.9	18,670	xxxx	40,436	46.3	38,256	xxxx
—Woven wire fence	16	29	1,113,860	30,081	35.2	29,383	xxxx	65,116	36.2	61,539	xxxx
—Bale ties	12	30	149,780	5,792	50.4	6,253	xxxx	11,774	48.6	11,583	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	35,107	82	xxxx	xxx	69,285	82
—Chemically treated	8	32	465,000	12,081	35.9	9,320	xxxx	21,508	28.6	16,373	xxxx
Tin and Terne Plate—Hot dipped	10	33	3,793,850	160,012	55.0	152,705	xxxx	338,025	55.1	333,239	xxxx
—Electrolytic	10	34	2,251,850	63,225	36.9	54,415	xxxx	134,431	37.3	111,754	xxxx
Sheets—Hot rolled	30	35	19,197,320	1,049,252	71.2	517,776	22,004	2,185,806	70.4	1,057,457	53,266
—Cold rolled	12	36	7,131,460	331,732	60.6	190,155	xxxx	683,133	59.2	386,194	xxxx
—Galvanized	16	37	2,915,130	144,066	64.4	139,223	xxxx	296,268	62.9	278,053	xxxx
Strip—Hot rolled	24	38	7,055,390	219,367	40.5	138,028	19,414	440,241	38.6	276,249	40,402
—Cold rolled	35	39	3,119,850	108,439	45.3	106,790	xxxx	229,597	45.5	216,099	xxxx
Wheels (car, rolled steel)	5	40	319,400	24,642	100.6	22,054	xxxx	48,501	93.5	45,484	xxxx
Axles	2	41	408,170	11,275	36.0	11,148	xxxx	22,363	33.9	20,840	xxxx
All other	2	42	176,290	2,916	21.6	2,994	xxxx	6,140	21.5	6,117	xxxx
TOTAL STEEL PRODUCTS	152	43	xxxx	xxxx	xxx	5,184,498	408,121	xxxx	xxx	10,616,482	916,233
Effective steel finishing capacity	152	44	67,310,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	152	45	xxxx	xxxx	xxx	92.5%	xxxx	xxxx	xxx	89.1%	xxxx

During 1945 the companies included above represented 98.9% of the total output of finished rolled steel products as reported to American Iron and Steel Institute.

Industrial Briefs . . .

United Shoe Machinery Co., Lowell, Mass.
U. S. Hoffman Machine Co., Poughkeepsie, N. Y.
General Motors Corp., Olds Division, Kansas City.
J. A. Jones Construction Co., Sheffield, Ala.
Higgins Industries, New Orleans.
Baldwin Piano Co., Cincinnati.
Tokheim Engineering Co., Indianapolis.
Brown & Root Co., Houston.
Electric Boat Co., New London, Conn.
General Motors, Kansas City.
Jones & Laughlin Steel Corp., McKeesport, Pa.

Forgings for Shell, 105mm

Rheem Mfg. Co., Las Vegas, Nev.
National Supply Co., Washington, Pa.

Shell, 81mm

Peerless of America, Marion, Ind.
Excel Foundry Co., Fall River, Mass.

Stampings for Shell, 81mm

Chase Brass & Copper Co., Cleveland.

Shell, 75mm

Palmer Bee Co., Ellettsville, Ind.
Remington Rand, Inc., Marietta, Ohio.
Harris Mfg. Co., Johnson City, Tenn.
Airflow Corp., Wilkes-Barre, Pa.
Coplay Cement Co., Allentown, Pa.
Dravo Corp., Neville Island, Pa.
Van Norman Machine Co., Springfield, Mass.
Ludington-Griswald, Inc., Saybrook, Conn.
H & B American Machine Co., Pawtucket, R. I.
Rheem Mfg. Co., Brooklyn.
Stockham Pipe Fitting Co., Birmingham.

Booster

Barr Mfg. Co., Weedsport, N. Y.
Robertshaw Thermostat Co., Youngwood, Pa.
High Standard Mfg. Co., Hamden, Conn.
Brunner-Ritter Co., Bridgeport, Conn.
Moraine Products Co., Dayton.
Midwest Machine Co., Columbus, Ohio.
Domestic Mfg. Co., Inc., Los Angeles.
Lamb-Grays Harbor Co., Hoquiam, Wash.
Kaiser Industries, Denver.
Stuart Engineering Co., Norwalk, Conn.
Lamson Corp., Syracuse.
Electric Autolite Co., Toledo.
Kaiser Industries, Scranton, Pa.

Fuse, M54

Holley Carburetor, Detroit.
Central Spec. Co., Ypsilanti, Mich.
Milwaukee Gas & Spec. Co., Milwaukee.
Pitney Bowes Postage Meter Co., Stamford, Conn.
Litho Equipment Co., Chicago.
International Harvester, St. Paul.

Time Train Rings for Fuse, M54

Gilbert & Barker, Springfield, Mass.
Holst, Milford, Conn.
Perkins Machine & Gear Co., Springfield, Mass.

New Ruling on Pickled Sheet

Washington

• • • Amending Direction 67 to CMP Regulation No. 1, WPB has announced that production of hot rolled pickled steel sheets or strip during any month of the second quarter on all orders from distributors accepted by producers must be limited to 50 per cent of the total pickled tonnage originally specified by a distributor on all his orders accepted for delivery in the month.

• **SWP CONTRACTS**—The Smaller War Plants Corp. placed \$93,238,974 in contracts in Illinois, Indiana, Iowa and Wisconsin during March, an increase of 65.3 per cent over the February showing, it was announced recently. A total of 754 contracts were awarded, against 496 in February.

Prime contracts totaled 471, subcontracts 254, and civilian contracts 29. Ordnance Department commitments for shells and ammunition led in total volume, with Signal Corps needs second and Quartermaster Corps third.

• **TO REPRESENT**—Gerotor May Corp., Logansport, Ind., has announced the appointment of Compressed Air Products, Newark, N. J., as exclusive sales representative of Gerotor air and hydraulic devices for New Jersey and Greater New York.

• **STAMPING PLANT**—Fisher Body Division of General Motors Corp. has announced plans to build a new stamping plant at Hamilton, Ohio, after the war. Body stampings and other sheet metal components will be shipped from the new factory to assembly plants.

A one-story plant will be constructed, totaling 1,200,000 sq. ft. of usable floor space. Ultimate payrolls will include about 3000 persons, it was stated by the company. A site of approximately 145 acres, recently obtained, will be used for construction to begin as soon as manpower and materials become available.

• **BUYS TRUCK Co.**—Fruehauf Trailer Co. has purchased Trombly Truck Equipment Co., Portland, Ore. The Trombly shops will operate in conjunction with Fruehauf's present Portland plant.

• **BUYS LAND**—Herbert T. Schmeller, former secretary of National Bronze & Aluminum Foundry Co., Cleveland, recent-

ly purchased a six-acre tract of land believed to be the site for the new E. F. & H. Bronze & Aluminum Foundry Co., organized by Edward, Frank, and Herbert Schmeller.

• **DISTRIBUTOR**—Appointment of the Perry Machinery Co., Dallas, Tex., as a special distributor of TOCCO process induction heat treatment equipment was announced by William C. Dunn, president of the Ohio Crankshaft Co.

• **AWARDS CONTRACT**—A contract for the manufacture of 4.2-in. chemical mortar shells has been awarded Dixie Metal Products Co., Inc., Birmingham, and production is expected to start by July 1. James A. Smith, company president, said 450 employees would be added to the firm's employment rolls.

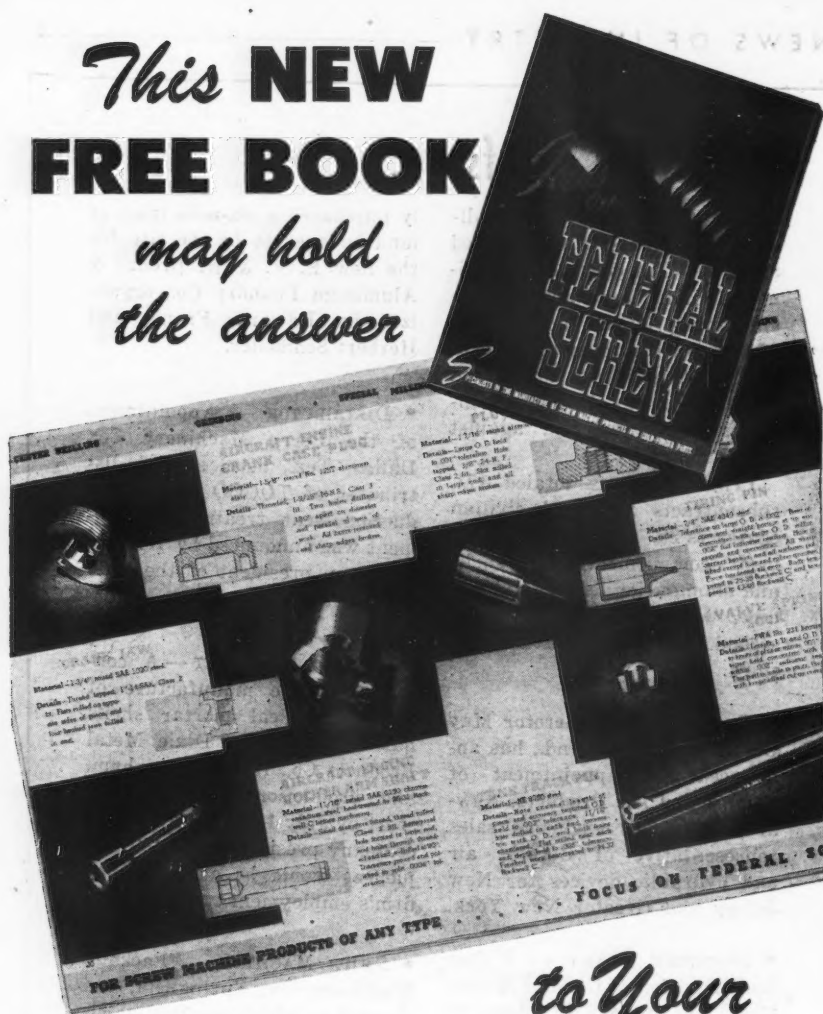
• **SHIPS MACHINE**—Package Machinery Co., Springfield, has shipped its initial machine which assembles and wraps hitherto wasted anthracite and bituminous coal dust in 7½ lb. packages at the rate of 8 to 24 a min. to the Blaw-Knox Co., Philadelphia. More of these machines are on order.

• **ROLLING STOCK**—Holyoke Street Railway Co. has asked permission of the Massachusetts Public Utilities Commission for authority to give chattel mortgages of \$100,000 to the Massachusetts Mutual Life Insurance Co. for the purpose of financing the purchase of new rolling stock. The mortgages represent 80 per cent of the purchase price.

• **RECONVERSION**—Draper Corp., Hopedale, Mass., textile machinery, is one of the first large New England industries to recon-vert 100 per cent. During the stress of war needs, the company produced machine tools, guns and magnetos.

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NEWS OF INDUSTRY

Urges Speedy Removal Of Wartime Controls When Emergency Ends

Washington

• • • Prompt removal of wartime controls as soon as emergency needs have ended, was urged this week in a statement on national policy issued by the Committee for Economic Development. Coupled with this recommendation was a warning against removal of any control at a time when it would "jeopardize any phase of the war effort or a successful transition to a healthy peacetime economy."

Calling for "selective" rather than indiscriminate abandonment of controls, the statement urges that immediate examination of various controls begin now and that within six months after the final conclusion of the war the director of reconversion recommend the removal of all controls that are not "clearly" necessary beyond that date.

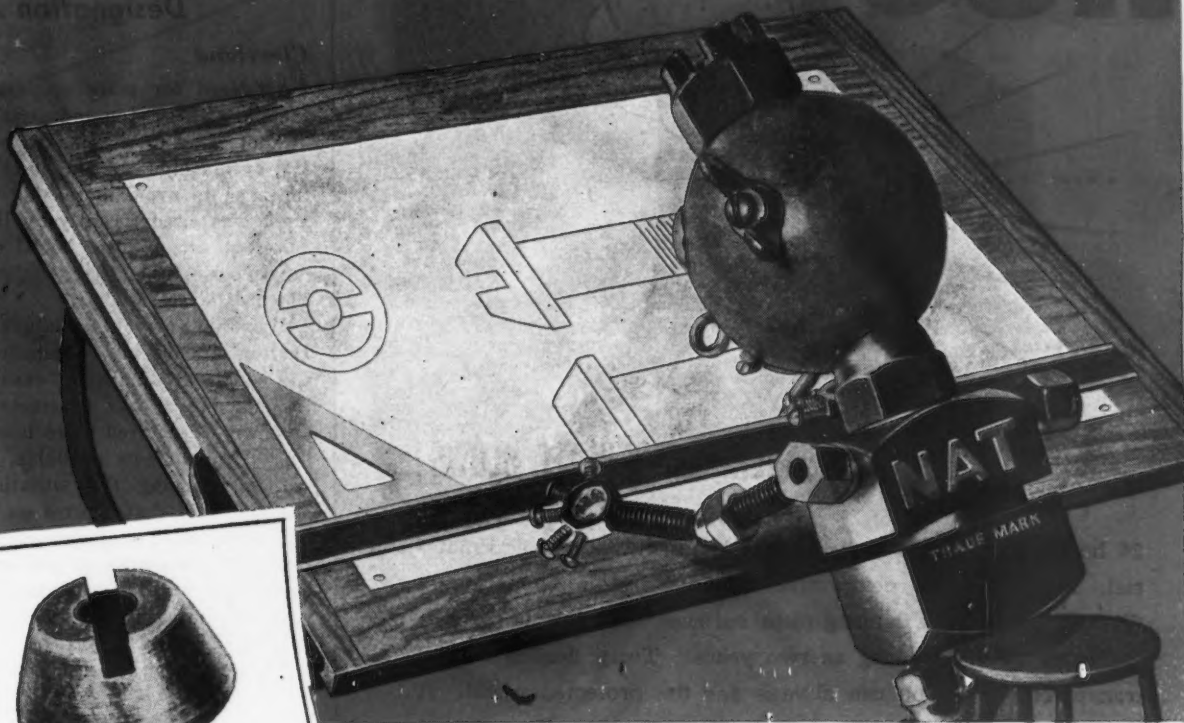
Legislative authority to reimpose inflation controls, if experience proves they are needed, should remain in the hands of the executive branch until the transition to high level peacetime employment is safely made. However, the statement emphasizes that no control "should be allowed to persist just because it is there, or because it worked well during the war."

The likelihood is that there will be four rather sharply defined periods with differing requirements as to the economic controls. The first is the period of war against two enemies, the next the period from the defeat of Germany to the defeat of Japan, the third a period of perhaps six months of reconversion, the fourth a final period of probably two years before the economy fully regains a peacetime pattern.

"Controls of materials," the report said, "should end selectively as each material is released from war use or becomes sufficiently available for civilian use. Manpower controls should be ended area by area as shortages of manpower disappear. The objective should be to time and coordinate such action so that our economy can land on its feet, prepared to go places."

With respect to price controls the Committee recommends that "general advances should be resisted, but prompt adjustment should be permitted prices which deter production because they do not bear a reasonable relation to cost at normal levels of production."

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2-122	Oil, Lubricating Preservative, Medium	X-Rust 421
AXS-934	Oil, Engine Preservative, Grade I-SAE 10	X-Rust 1097
AN-C-52a Type I alternate	Compound, Exterior Surface Corrosion Preventive	X-Rust 481
52-C-18	Compound, Rust Preventive, Thin-Film (polar type)	Tectyl 506
	GRADE I	Tectyl 502
	GRADE II	Tectyl 511
	GRADE III	

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Dayton Trying To Avoid No. 1 Labor Designation Again

Cleveland

... Need for more cooperation on the part of Dayton industrial plants by not seeking more war contracts and by placing work outside the Dayton area to avoid increasing employment was cited recently by H. Glenn Johnson, acting local WMC director, in discussing the current labor situation in the area.

Mr. Johnson told members of the Dayton Emergency Committee that the existing conditions result from the placing of war contracts in the area which required more labor facilities than are now available.

In canvassing the situation, Mr. Johnson said that figures on present and anticipated employment indicate that 3906 male workers will be needed between now and May 15 and that the best estimates show that only 600 will be available.

He outlined the situation as follows:

(1) Do nothing and let Dayton automatically become a No. 1 critical area, which will happen when the current shortage of workers reaches 1.5 per cent of total employment.

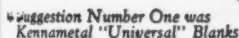
(2) Force transfer of workers from less essential employment to work carrying a high urgency rating, through reduction of employment ceilings in plants having less essential production.

(3) Let Dayton industry cooperate on a program designed to conserve and protect its labor supply by not seeking war work which can be done elsewhere and by placing work outside the area to avoid increasing employment.

The first possibility, Mr. Johnson told the committee, will bring about drastic restrictions on the placing of new contracts, renewal of existing contracts or acceptance of subcontracts.

In connection with the program designed to help solve the situation, Mr. Johnson urged all industrialists to communicate with his office to find out if manpower is available before seeking or accepting employment. Such a procedure, he added, is in keeping with a pledge signed by Dayton manufacturers, which was responsible in reclassifying Dayton in a No. 2 labor area instead of a No. 1 critical area.

*Suggestion Number Two**



SHANK ADAPTOR FOR CROSS SHELL LATHE

9 1/2"

2 1/2"

1"

Socket type set screw

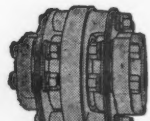
THE IRON AGE, April 19, 1945—115

THOMAS

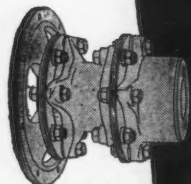
flexible **COUPLINGS**
FOR *any* SPEED OR SERVICE



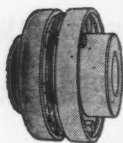
TYPE DBZ



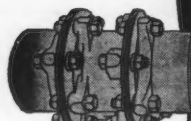
TYPE DSM



TYPE CM



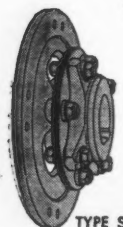
TYPE ST



TYPE AM



TYPE MT



TYPE SS



TYPE DBZ-D

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WARREN, PENNSYLVANIA

NEWS OF INDUSTRY

Guide to Management In Labor Relations New York

• • • Charting for management the road to good and bad practices in labor relations in the postwar period, a new book "Management at the Bargaining Table" has just been published by the McGraw-Hill Book Co., Inc., and available at newsstands at \$3.

Written by Lee H. Hill, vice-president of Allis-Chalmers Manufacturing Co., and Charles R. Hook, Jr., secretary and assistant to the general manager of Rustless Iron & Steel Corp., both of whom are industry members of the National War Labor Board. Both authors have experienced collective bargaining as industrial relations executives who have negotiated union contracts, and as members of WLB called upon to arbitrate disputes between labor and management.

Much of the book deals with the content of the collective bargaining agreement, and clauses which protect the union, management, and employees. Treatment of seniority and handling of grievances are discussed in detail, and areas are pointed out where management and labor get into difficulties.

British 1944 Exports Near Prewar Volume London

• • • British exports to Canada and the United States were reduced slightly in 1944 to \$160.4 million as compared with \$172.4 million in 1943, according to a recent report of the British Board of Trade. However, total exports to North America in 1944 were only one-tenth less in value than in the last prewar year, 1938.

Britain's total export trade rose in value in 1944 to \$1.032 billion from \$931.2 million in 1943. According to the report, special exports to Russia accounted for \$56 million of the increase, partly counterbalanced by \$44 million less to South America, one of Britain's best prewar markets.

Average values of exports as a whole rose to 171 and 178 per cent, respectively, of 1938 exports, an indication of the magnitude of the reduction to be applied to make them comparable on a quantity basis with those for 1938. Exports to British countries not under enemy occupation in 1944 were \$679.2 million as compared with \$596.8 million in 1943.

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● THE LIMITROL COMPARATOR ROLL THREAD SNAP GAGE by WOODWORTH has proven its *efficiency* and *utility* in hundreds of war plants for many months under the pressure of war production. The LIMITROL has proven that it will reduce effectively your inspection costs by combining greater

speed with greater *accuracy*.

The LIMITROL *checks* errors involving pitch diameter, lead, taper, angle, out-of-roundness and straightness. Also supplied with rolls to check plain parts. It eliminates "feel" and reduces scrap. *Write for your copy of the Limitrol Catalog No. 44-L.*

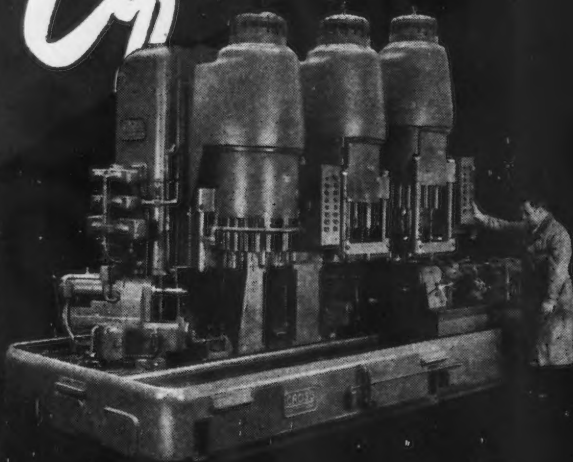
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DRILLING, COUNTERSINKING and TAPPING the assembly holes in the bowl face of truck axle housings on Cross 3-Station Automatic Transfer Machine.

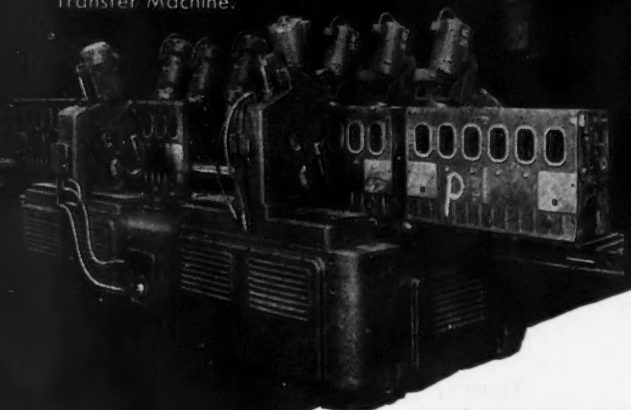


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MILLING cylindrical, conical or flanged work externally or internally.

DRILLING and TAPPING five holes simultaneously in cylinder blocks with Cross Automatic Transfer Machine.



Send for the new Cross Catalog which contains 35 detailed case histories of successful Cross Special Machines. For your copy, write on your letterhead to The Cross Company, Detroit 7, Michigan, Department 122.



CROSS


New York

Chicago


DETROIT

Cleveland

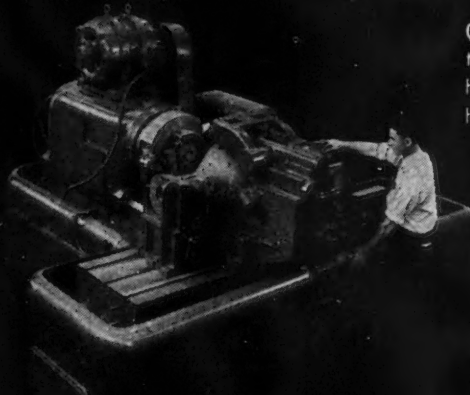
Dayton



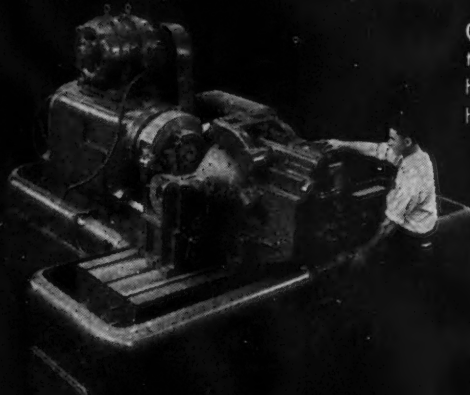
CHAMFERING a wide variety of internal and external spur and helical gears using the new Cross continuous rotary cutting action.




GRINDING and HONING two hardened taper bearings in automotive wheel hubs, automatically finishing 55 an hour to fine accuracies.



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Dollars invested in Cross Machine Tools deliver maximum performance *with maximum profit*. Each machine is individually engineered and custom built *to suit the work*—capacity, production, horse-power, handling facilities, floor space, perishable tool and price factors are carefully balanced

and brought into focus on the ultimate function: production for profit.

Forward looking manufacturing executives are utilizing the services of Cross Engineers to *equip for the job*. Hunting a job to suit general purpose equipment compromises the profit dollar.



S-19

SPECIAL MACHINES

for automatically performing any one or a combination of metal cutting operations
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HOW TURNER GAUGES CAN BE USED ON YOUR POST WAR PRODUCTS



A machine for bagging dust is certainly a much milder instrument than a machine for bagging Japs, but the old production problems will still be there. When you start to make peace time products you'll want production to run along with a minimum of snags . . . you'll want those products to roll off the line fast.

Turner Gauges, such as the plug, ring, flush, and snap types, will fit into your production picture to help you produce a better product in less time.



TURNER GAUGE GRINDING COMPANY

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The men who make TURNER gauges

We believe that the development of the individual and the expansion of our company are *mutually dependent realities*. That is why the men at Turner experience individual freedom and initiative, which in itself, seems to encourage a real desire for cooperation among all employees.

Standards Committee To Correlate Army And Navy Drafting Work New York

• • • At the request of the War Production Board the American Standards Association is starting to develop a series of American War Standards for drawing and drafting room practice that will correlate the practices of the Army and Navy with those of industry, according to an announcement made recently by the Association.

This is a large undertaking. Blueprints, plans, and drawings which are all involved are used in the design and manufacture of even the simplest mechanical device. This new work requested by the military proposes to carry the subject further into the complicated realm of modern industrial production.

Army and Navy spokesmen feel that marked economies will result from the work. The present existing diversity of drafting practices between the various branches of the Armed Forces and industry, together with its attendant waste and confusion and delays in providing the drawings needed for war equipment, has long been recognized by the services.

At present, a prime contractor having contracts with several government agencies has to spend considerable effort on the one minor item of seeing to it that each of his sub-contractors and each division of his own company understands precisely what drafting practices are to be used.

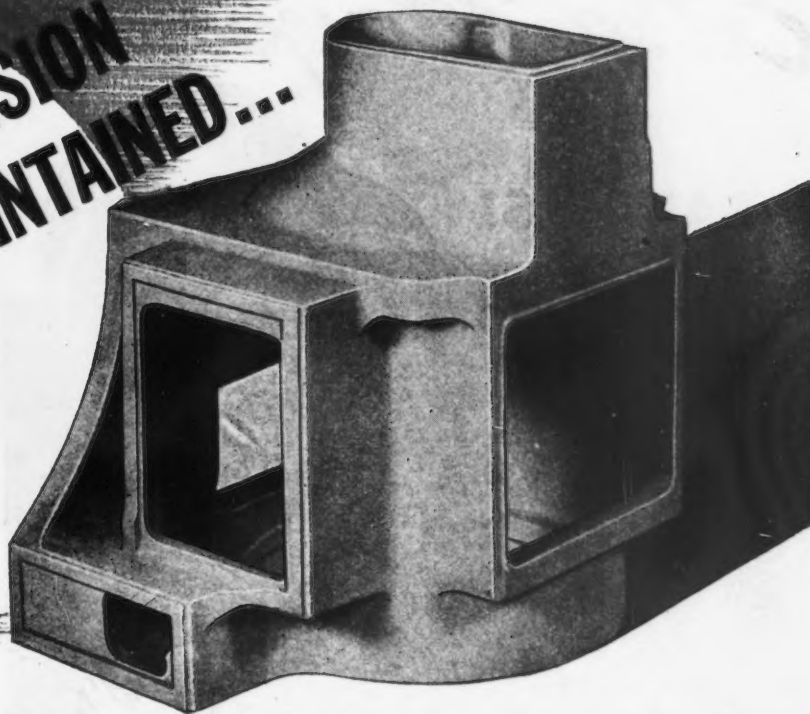
Work on these new war standards has already started. It is being financed by the WPB through an already existing government contract under which the ASA has since July 1942, completed 88 standards of direct concern to the war effort and has under development some 68 more.

The military have outlined the scope of the work to include civil, mechanical, electrical aeronautical, and marine engineering.

The following subjects will be covered:

1. Abbreviations.
2. Methods of indicating and specifying threads.
3. Methods of lettering.
4. Drawing forms and sizes.
5. Graphical, diagrammatic and schematic symbols.
6. Methods of indicating and specifying materials.
7. Methods of indicating and specifying finishes.
8. Methods of dimensioning and indicating tolerances.
9. Methods of numbering drawings.

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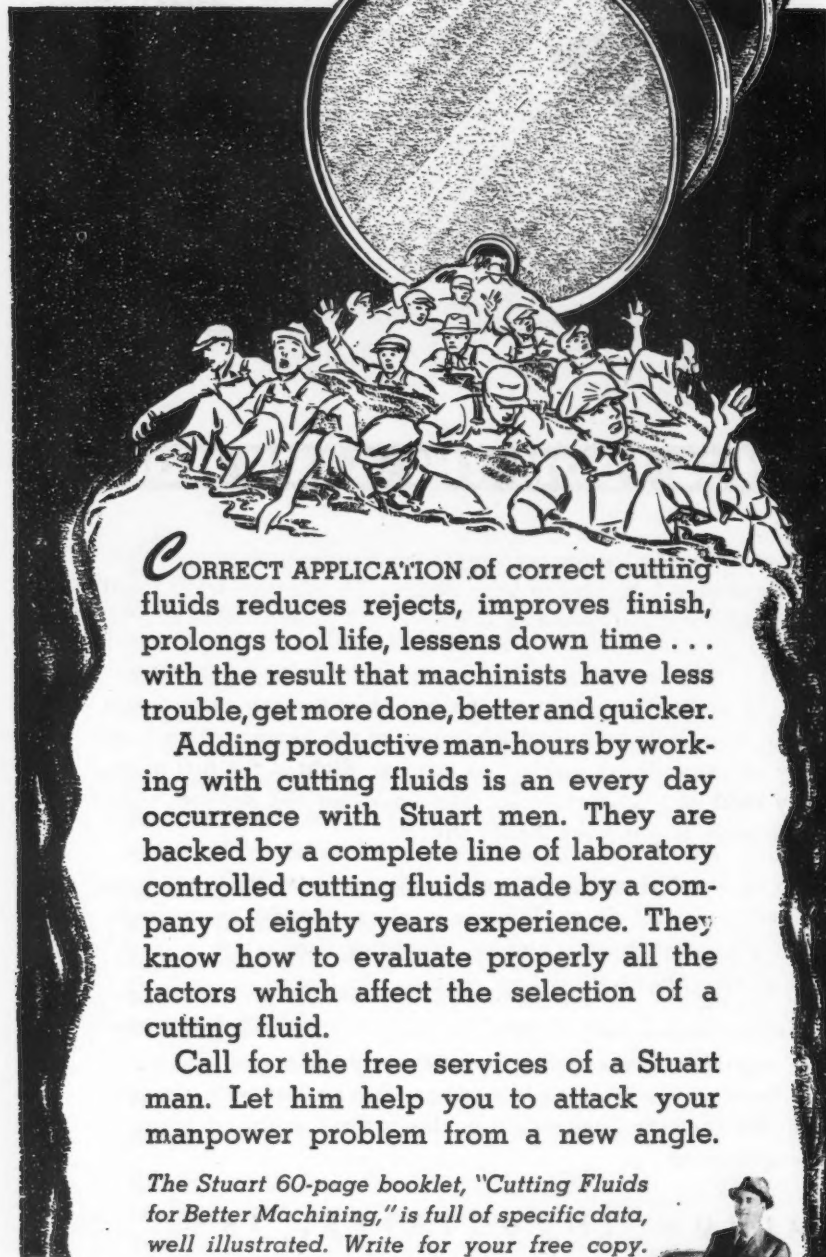
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CORRECT APPLICATION of correct cutting fluids reduces rejects, improves finish, prolongs tool life, lessens down time . . . with the result that machinists have less trouble, get more done, better and quicker.

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NEWS OF INDUSTRY

Midland Steel Will Start Reconversion

Cleveland

• • • At least a part of the facilities of the Midland Steel Products Co. will be reconverted to peacetime production this year, and this reconversion will be as rapid as the company's products are required by customers upon their own reconversion, according to the annual report sent to stockholders recently.

In the report, E. J. Kulas, company president, stated that 1944 net income after all charges, including federal income and excess profits taxes, amounted to \$1,722,448 or \$3.62 a common share. Both sales and profits after all charges except taxes were the highest in Midland's history. Net current assets of the company as of Dec. 31, 1944, were reported at \$10,937,530.

During the past year the company started an expansion program at its Detroit plant costing an estimated \$510,000. On property which had been used for the storage of frames, a new building, containing 18,000 sq. ft. of floor space and a crane runway, was erected. One of the largest mechanical side presses ever built is now being installed.

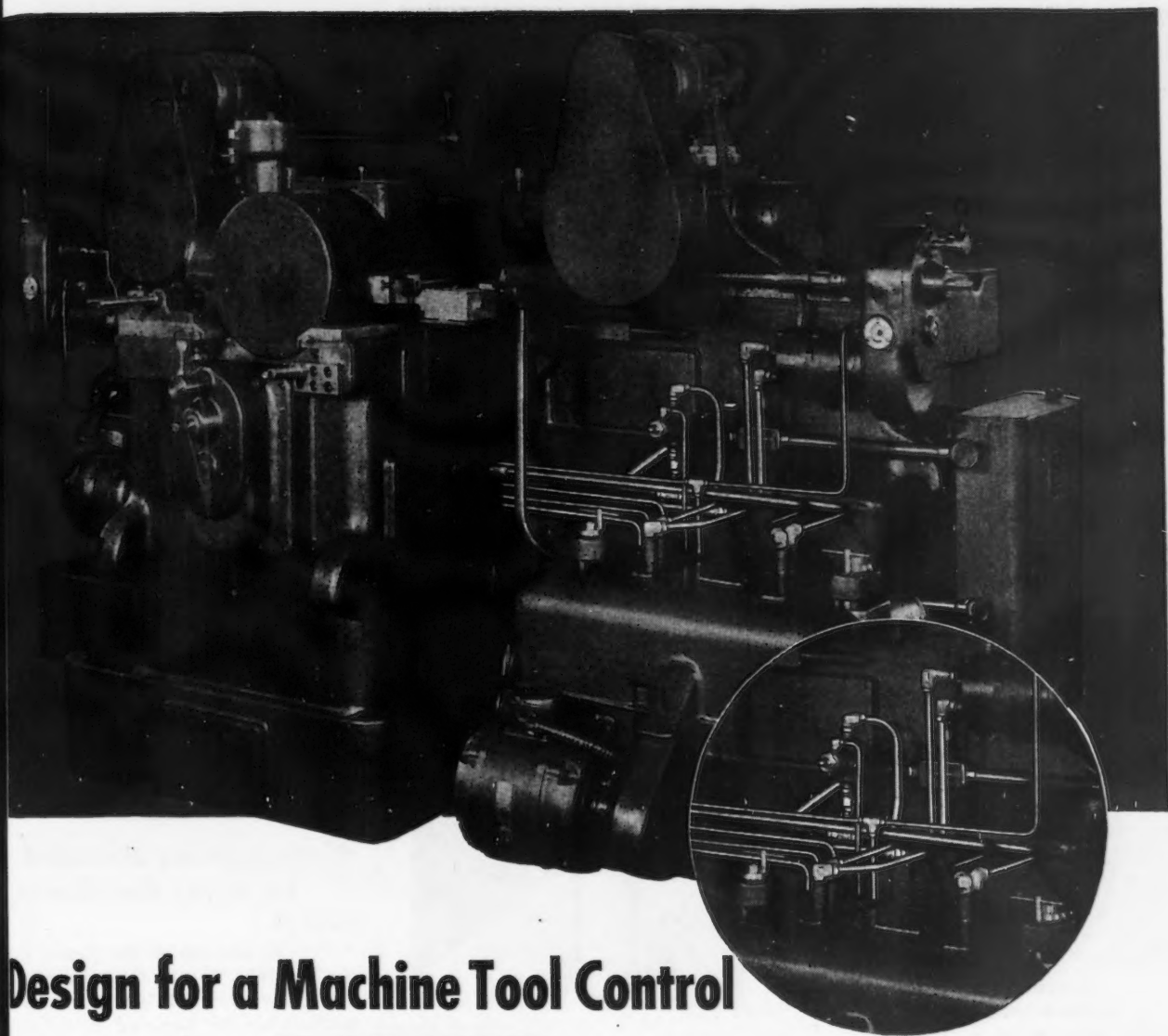
To replace this storage area and provide additional space for storage and manufacturing facilities, an adjacent tract of land was acquired on which several manufacturing buildings are situated. These contain about 125,000 sq. ft. of floor space now under lease, but which will be available to Midland at the end of hostilities in Europe.

Reveals New Tank Production

Chicago

• • • The Beachbuster, new amphibian tank whose use in the Okinawa landings has been revealed by the U. S. Navy, has been produced in volume by Borg-Warner Corp. for almost a year, it was learned here recently.

The Ingersoll-Kalamazoo plant as designer supplies "following" yards with designs and specifications, and purchases approximately 75 per cent of their material for them. It is estimated that 2000 of the items that comprise a tank are manufactured by Ingersoll. The remainder of the material is supplied by more than 250 firms who are participating in the tank-building program.



Design for a Machine Tool Control by **PARKER**

Consider this as an example of the many types of machine tools that are designed to use tubing systems for hydraulic control and for lubrication.

When a machine tool tubing installation is designed in conformance with sound Fluid Power Engineering principles it will:

- (1) Allow the closest practicable approach to perfect streamline flow which in turn will reduce to a minimum the capacity and pressure requirements on the power source and give a better response to control throughout the entire system.
- (2) Permit the efficient use of available space . . . no matter how cramped this space may

be . . . and still provide a system that allows unobstructed service and maintenance on all component units of the system.

- (3) Reduce the number of joints and connections to a minimum . . . each one tight, leakproof and able to withstand excessive abuse, vibration and pressure.

Parker valves, fittings and fabricated tubing—plus Parker Engineering—

will give you a simple, neat installation, easy to service, free from troubles, efficient and economical.

Whatever you make—motor vehicles, earth-movers, presses, aircraft, refrigeration or process equipment, ask a Parker engineer for recommendations based on this "know-how". Write to The Parker Appliance Company, 17325 Euclid Avenue, Cleveland 12, Ohio. Booklet on request.

PARKER

THE PARKER APPLIANCE COMPANY

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Thomas Strip
COLD ROLLED STRIP

PRECOATED WITH NICKEL

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ELECTRO-COATED ZINC, COPPER, NICKEL AND BRASS . . . HOT DIPPED TIN AND SOLDER . . . LACQUER COATED IN COLORS . . . UNCOATED PRECISION STRIP, CARBON AND ALLOY SPECIALTIES.

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NEWS OF INDUSTRY

Packard to Expand Car And Engine Production

Detroit

... Packard Motor Car Co. plans broadened activity in aircraft, marine and industrial engine manufacture, as well as an expanded postwar automotive goal of 200,000 cars a year, it was stated in the 1944 annual report to stockholders.

Production of aircraft and marine engines will continue after the war. In addition, the company intends to continue its present program of research and development in war and specialized engines. Also consideration is being given to postwar expansion of the Packard line of passenger cars into the commercial car and taxicab fields.

Factory employment at the end of last year totaled 33,085 persons, and postwar planning calls for a payroll requirement of 28,000, as compared with the prewar peak of 12,000.

As against last year's net sales of approximately \$455,000,000, volume for 1945 should be approximately \$350,000,000, the report predicted.

Wage Increase Awarded To Aetna Ball Bearing

Chicago

... Employees of the Aetna Ball Bearing Mfg. Co., Chicago, have been awarded a general 11½c. hourly wage increase by the Regional War Labor Board.

The order, which affects 379 workers, also provides for call-in pay, payment of union stewards for time spent adjusting grievances, and institution of a 10 per cent premium for night work. It also settles methods of computation of vacation pay and of overtime in weeks which include holidays. C. B. Magrath and W. Homer Hartz, industry members of the board, dissented from the wage increase decision which was based on an inequity between the company's old rates and official stabilized rates for the Chicago metal working industry. Mr. Magrath and Mr. Hartz argued that the official rates were a composite of the existing wage structures of three different metal working industries—ordnance and aircraft, electrical machinery and products (except radio), and machinery and manufacturing (except tool and die shops)—and that it was unreasonable to try to combine the three different rates in a composite rate to apply to all metal working industries.

The CONE AUTOMATIC MACHINE COMPANY



sees many

GOOD THINGS AHEAD

It is reported that

New ideas in highway busses include: separate engines for each driving wheel, hydraulic transmission, increased use of aluminum, 50 passenger capacity, two decks, wider treads and steam power. *Business Week*.

get ready with CONE for tomorrow

A new process deposits a ceramic insulating covering on electric wire. *Sprague Electric Co., N. Adams, Mass.*

get ready with CONE for tomorrow

A new storm-proof wire for rural electrification is made of steel wire covered with copper. *American Steel & Wire Company.*

get ready with CONE for tomorrow

About 10% will be added to the country's cold storage capacity if plans to use a 12 million cubic foot limestone mine for that purpose are successful. *Food Industries.*

get ready with CONE for tomorrow

"Molecular distillation" is now out of the laboratory stage and promises to do such incredible jobs as to separate fish oil from its smell. *McGraw-Hill Overseas Digest.*

get ready with CONE for tomorrow

A hardware wholesaler carrying 50,000 items plans to set up a chain of "cafeteria style" hardware stores after the war. *George Worthington Co., Cleveland.*

get ready with CONE for tomorrow

Claims for the new home heater developed by the Bituminous Coal Institute include: one-third reduction in fuel use, 50 hours of heat in one stoking, cost under \$100. To parallel this development, Anthracite Industries Inc. has a furnace 2 x 3 x 3 feet that weighs only 75 pounds. It consists of a tube with the coal entering at one end and ashes forced out at the other. *Coal Age.*

get ready with CONE for tomorrow

A new surgical lamp projects a cone of ultraviolet radiation, through which germs cannot pass, around the wound. *Hanover Chemical & Mfg. Co.*

One of the large oil companies announces a motor lubricant claimed to be unaffected by temperatures from 100 below to 200 above zero. *Cities Service Oil Co.*

get ready with CONE for tomorrow

A new stirring device is driven by an extended motor that revolves the internal rotor by magnetic attraction. *Ohmrite News.*

get ready with CONE for tomorrow

A large trucking company, operating in eleven states, plans to add air freight service as soon as planes are available. *All States Freight Inc.*

get ready with CONE for tomorrow

A chemical company has produced a solution which, it claims, will prevent runs in stockings and may be applied with a sponge. *Monsanto Chemical Co.*

A flashlight, in which battery, bulb, and lens are cast in a cylinder of wax, is said to be cheap enough to throw away when its batteries are exhausted. *Geyau Manufacturing Co., Charlestown, Mass.*

get ready with CONE for tomorrow

The electron micro-analyzer reports on the atomic composition of particles too small to be seen by microscopes. By its use the point of a common pin can be made to look as vast and rough as a mountain range. *Optical Society of America.*

get ready with CONE for tomorrow

In war planes the present type of engine is twice as efficient as jet propulsion at 150 miles per hour; the two are equal at 300 miles; and at 550, jet propulsion is twice as efficient. *EMPIC No. 7.*

get ready with CONE for tomorrow

Steam busses, now being designed, appear to have many advantages, including smooth operation, no idling, no fumes, low operating cost, engine braking, and longer service between overhauls. *Bus Transportation.*

Automatic Production

at

automatic-cannon speed



The 1½" 3-Spindle Conomatic produces these 20mm. tracer bullets in 8 seconds each. Production like this keeps shell supplies ahead of the requirements of rapid firing guns. Conomatics, in wartime, are a military necessity — in peacetime, an economic necessity.



CONE

AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U. S. A.

16

Rickert FOR 35 YEARS Shafer

MODEL "F" *Automatic* DIE HEAD

1. Compact—few parts.
2. At end of thread cut—head snaps open.
3. Reset automatically, or manually with $\frac{1}{4}$ turn of handles.
4. Opens by pull-off method.
5. Easy adjustment for thread length.
6. Easy adjustment for lateral float.
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R-S, for over 35 years has stood for Rickert-Shafer, and precision threading equipment. Over the years we have concentrated most of our attention on second operation tools, Die Heads of all kinds, Collapsible Taps and Boring Heads. We have found time to design and build thousands of Friction-type Tapping Machines and hundreds of special designed-for-the-job Threading Machines. What is your production threading problem? Write today.

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DIE HEADS • COLLAPSIBLE TAPS • BORING HEADS
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NEWS OF INDUSTRY

Pilot Ordnance Orders Urged by Campbell To Assure Preparedness

Chicago

• • • Pilot orders to keep manufacturers constantly in a position to shift to war production were urged by Maj. Gen. Levin H. Campbell, Jr., Army chief of Ordnance before the Chicago War Production Conference here recently.

"The nation must be willing to pay a sizable insurance premium to maintain a state of technological preparedness," he said. "In addition we must be willing to pay to keep industry ready and able to shift rapidly to war production."

"To be properly prepared we will have to maintain a high stage of development in the design of all types of war materiel. The problem will be for our scientists and technologists to keep us ahead of all other nations in the field of weapons development. Armament development is a highly specialized science, and often many years of research are necessary to produce the final product. This means that many capable research workers must devote their lives to the activity."

He emphasized the necessity for broad programs of war research at all times stating that the demands of warfare are so great and their effects upon the social and economic structure of the nation so marked that planning for war must be perpetually sustained effort.

From July 1940 to the present, the procurement program of the Ordnance Department totals about \$46 billion with approximately 300,000 separate items, including more than 2000 major assembled products such as tanks and guns in production, it was revealed.

From July 1940 to December 1944 the Ordnance Department has been responsible for the production, among other items, of 75,000 tanks, 37 billion rounds of small arms ammunition, 3 million tons of artillery ammunition, 4 million tons of bombs, 770,000 trucks, 130,000 self-propelled guns, 50,000 anti-aircraft guns, and 55,000 pieces of field artillery, General Campbell declared. Production totals for 1944 promised to be the greatest in history should the two-front war continue, he stated.

Emphasizing the importance of mechanical ingenuity among American troops, the Ordnance Chief pointed out that after years of study and research on the bazooka, a soldier using

Logan A NAME TO REMEMBER WHEN YOU THINK OF BETTER LATHES

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VALUE PRECISION**



The men who build Logan Lathes place a premium on precision. From their own daily experience in building precision machines they know

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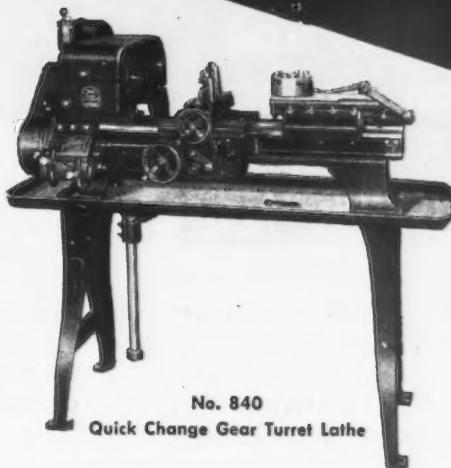
Brief Specifications

Common to all Logan Back Geared Screw Cutting Lathes, Hand Screw Machines, Quick Change Gear Lathes, and Manufacturing Turret Lathes, Bench, Floor and Cabinet Models

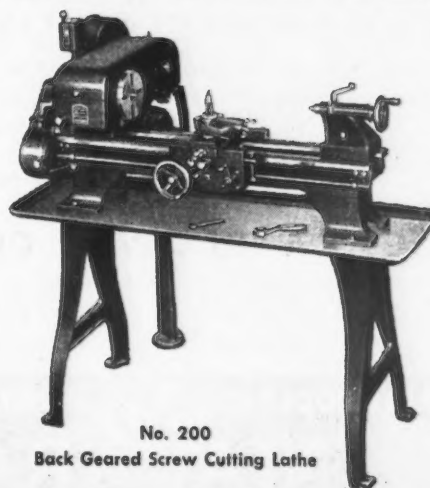
Swing over bed, 10 1/2"
Bed width across ways, 6-15/16"
Bed length, 43 1/8"
Size of hole through spindle, 25/32"
Spindle nose diameter and threads per inch, 1 1/2"-8
Spindle speeds (back gears engaged) . . . 30, 56, 104, 131, and 244 r.p.m.
Spindle speeds (direct belt driven) . .

179, 334, 420, 620, 780, and 1450 r.p.m.
Size of motor . . 1/3 or 1/2 h.p., 1750 r.p.m.
Preloaded precision ball bearing spindle mounting
Drum type reversing motor switch and cord
Precision ground ways, 2 prismatic "V" ways, and 2 flat ways

LOGAN ENGINEERING CO.
CHICAGO 30, ILLINOIS



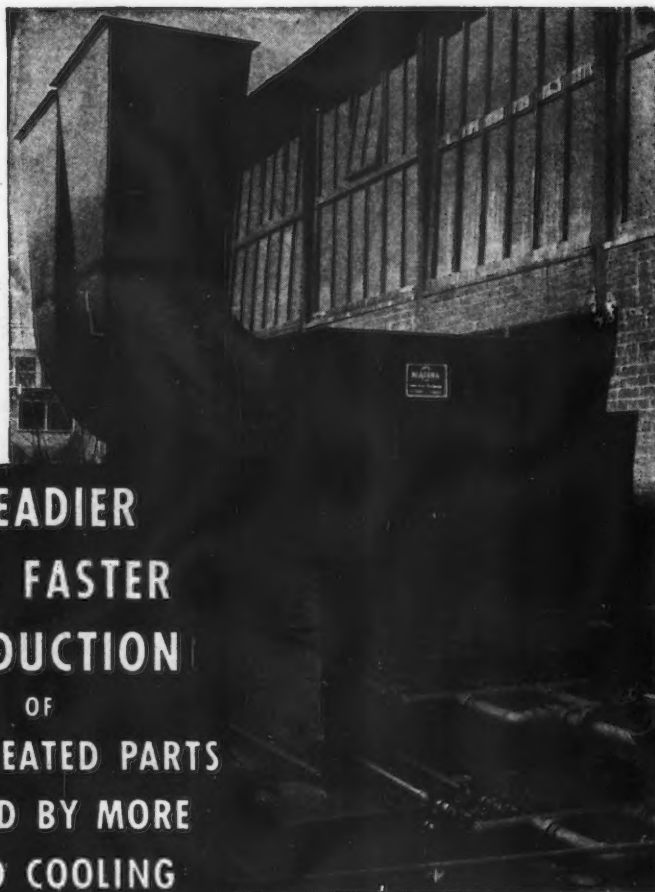
No. 840
Quick Change Gear Turret Lathe



No. 200
Back Geared Screw Cutting Lathe

C-1

**STEADIER
AND FASTER
PRODUCTION
OF
HEAT TREATED PARTS
GAINED BY MORE
RAPID COOLING
OF THE
QUENCHING BATH**



U. S. Patent Nos. 2,296,946,
2,321,933. Re-Issue No. 22,553.
Other Patents Pending.

● In a certain plant, heat treating equipment planned to complete five units in a given time period was unable to produce better than three until the NIAGARA AERO HEAT EXCHANGER was installed to cool and control the quenching bath temperature.

This increased production was the result of the extra capacity of evaporative cooling, the principal perfectly applied by the NIAGARA AERO HEAT EXCHANGER.

It also gives positive control of temperature which improves the quality of your heat treating and reduces rejections—and it saves 95% of cooling water costs.

Write for illustrated Bulletin No. 96

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HUMIDIFYING • AIR ENGINEERING EQUIPMENT

NEWS OF INDUSTRY

it in action devised an improved sight almost immediately. The improvised sight came back to the United States by air and within two weeks more than 2000 sights built according to the new design were flown back to the fighting front.

**DPC to Construct New
Mack Plant for Buses**

New York

• • • Construction of a half-million dollar plant for the production of the new Mack C41 buses has been started at Fullerton, Pa., according to C. T. Ruhf, president of Mack Trucks, Inc.

The new structure, being built through Defense Plant Corp., replaces the production of Mack's own plant, which was requisitioned by the Navy two years ago and converted to the manufacture of torpedo dive bombers. The one-story, steel supported structure will give Mack 73,000 sq. ft. of floor space in addition to 54,000 sq. ft. in adjoining or nearby buildings. The building is expected to be completed by mid-summer and production should begin by late summer.

The WPB authorized Mack to produce the 41-passenger transit buses several months ago. In its other plants at Allentown, Pa., New Brunswick and Plainfield, N. J., Mack is continuing its heavy schedule of trucks for Army and essential civilian use.

A few of the innovations engineered into the new models to enhance "rider appeal" are: A new heating and ventilating system; automatic transmission; improved spring flexibilities; and better driver visibility.

Railroad Revenues at Peak

New York

• • • Operating revenues of the railroads in 1944, were the largest on record, showing an increase of 4.2 per cent over the preceding high record in 1943, according to the Alexander Hamilton Institute. This increase, however, was more than offset by a rise of 11 per cent in operating expenses. As a result, railroad profits declined to \$668,000,000 in 1944 from \$873,000,000 in 1943. Profits in 1943, in turn, were smaller than in 1942 when they amounted to \$902,000,000. Reports for January of the current year show a continuation of this downward trend, with profits declining to \$40,000,000 from \$45,000,000 in January last year.

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1. Samples to be tested must be properly placed in dis-
charge clamps. 2. Sample in position. 3. 38,000
volts are passed between pointed ends of sample. Tem-
perature of spark is approximately 8000°C. At this
temperature the molecules of steel are passed into
space. The sample is thus photographed. 4. Photo-
graphic plate is removed from spectrograph prepar-
tory to developing. When developed, plate shows the
spectrum of the sample. 5. Plate is placed in micro-
photometer. Lines on plate are the spectra produced
by the high voltage spark discharge. Density of lines
are in proportion to the percentage of the various
alloys present.



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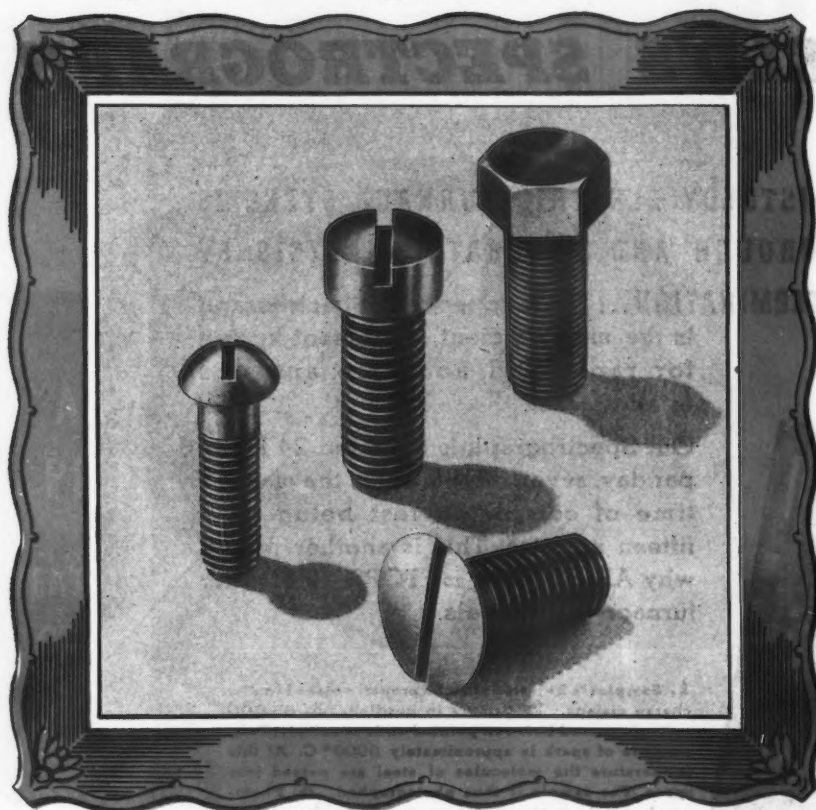
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NEWS OF INDUSTRY

A New Army Carbine Fires Automatically

Dayton, Ohio

... Announcement of a new Army carbine, designed to fire automatically, in production here at the Inland Mfg. Division, General Motors Corp., was made recently by Col. J. C. Shoulin, chief of the Cincinnati Ordnance District.

This new carbine is a modification of the original model which has been made at Inland, and was devised to meet a new demand in different terrain and against new tactics.

Twenty days after a request had been made, the modification, by which full automatic fire can be delivered by a trip of the selector, was accomplished. As a result, the carbine will now continue firing at the rate of 750 rpm until the trigger is released or the magazine emptied. By a reverse movement of the selector, semi-automatic fire, as in the original model, is made possible. The selector, which weighs two ounces, is the only visible evidence of change in the M2 carbine.

Developed originally in 1941 as a replacement for the standard .45 cal. pistol, the carbine was changed as experience required, until it became capable of filling all the missions of a rifle at short range. Tests were made by the Army Ground Forces, and the Marine Corps, with the result that the adoption of the new carbine as a standard weapon was recommended.

February Employment Average Decreases

New York

... Employment increased in the steel industry during February, according to the American Iron & Steel Institute, when an average of 566,300 employees received wages and salaries during the month, compared with 564,000 in January and 583,000 in February 1944. The latest reported figure was the highest since last August when employment averaged 569,200.

Wage earners received an average of 125.0c. per hr. in February, compared with 123.3c. per hr. in January and 116.1c. per hr. in February 1944. Hours worked weekly averaged 47.2 in February, against 47.7 in January and 47.0 in February 1944.

Payrolls in February totaled \$138,414,800, compared with \$150,268,500 in January and \$137,615,200 in February 1944.

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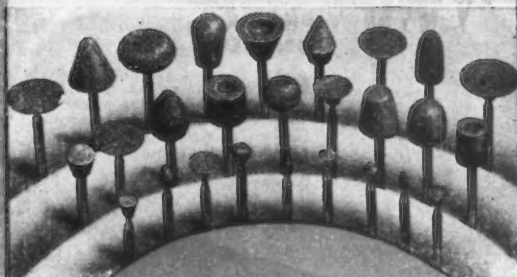
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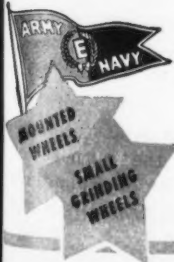
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"The ceaseless pounding of the vibrations from the defendant's engine against the walls of the plaintiff's mill is not incident to the neighborhood. The same annoyance would happen, under the same conditions, if both factories were on a farm. It was not a neighborhood hazard to be anticipated, and it is not one to be suffered. Community vibrations must be endured, but vibrating a community is a nuisance."

Above is a decision handed down by the courts of New Jersey. This lawsuit could have been avoided by mounting the offending machine on Korfund Vibration Isolators. Employing cork, rubber and steel springs in a wide variety of designs, Korfund Vibration Control will positively prevent the transmission of vibration. Write for descriptive literature . . . no obligation.



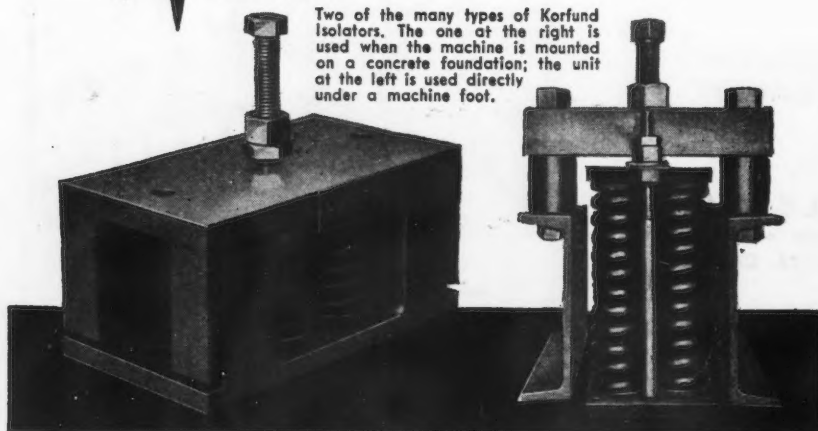
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Two of the many types of Korfund Isolators. The one at the right is used when the machine is mounted on a concrete foundation; the unit at the left is used directly under a machine foot.



NEWS OF INDUSTRY

Labor Disputes in '44 Reach Highest Figure

New York

• • • There were more labor disputes in the United States in 1944 than in any previous year in history, according to the Alexander Hamilton Institute. Strikes numbered 5000 last year as compared with 3752 in the preceding year and with the previous high record of 4740 in 1937.

This showing was mitigated to some extent, however, by other aspects of the situation. In the first place, the number of persons involved in labor disputes last year, totaling 2,100,000, exceeded by only a slight margin the 1,981,000 persons involved in 1943. Fewer persons were involved than in 1941, while the number was well below the record high peak in 1919.

In the second place, the number of man-days idle in 1944 totaled only 8,500,000 as compared with 13,501,000 in 1943 and with the record high figure of 28,425,000 in 1937. Man-days idle in 1944 represented only one-tenth of one per cent of total available working time.

While labor disputes in 1945 may continue to run above the average in view of the strong position which labor now holds, as the result of the shortage of workers, the prospect is that the difficulties will be ironed out without too much disturbance to the national economy. Labor's earnings are now the highest in history and the increase during the war has far outdistanced the rise in the cost of living.

Vanadium Reports on Income

New York

• • • The net sales of the Vanadium Corp. of America during 1944 amounted to \$26,450,620, as compared with \$18,654,663 for 1943. The consolidated net income for 1944 amounted to \$459,712, or \$1.13 per share of capital stock. This compares with the net income reported for 1943 of \$616,605, or \$1.52 per share.

Through lease arrangements, the government-owned mill in Utah, previously operated by the corporation under agency agreement, has been reopened in 1945 for the purpose of processing a stockpile of Vanadium ore recently purchased from an agency of the government.

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NEWS OF INDUSTRY

Naval Districts Work Surpluses Back Into Essential Production

Philadelphia

• • • By careful examination of local excesses of war material and efforts to find new uses for material no longer pertinent to the war effort the Fourth Naval District has been able to plow \$20,000,000 worth of such material back into the war production program since September 1944, thus preventing its sale on public bid at nominal prices or under scrap warranties.

Comdr. K. W. Heinrich, U. S. Naval Reserve, Naval architect formerly with New York shipyard, is in charge of the material redistribution program in the Fourth Naval District — Pennsylvania, Delaware and the southern eight counties of New Jersey.

In September 1944, as a result of the Baruch-Hancock Report of 1944 bearing on the demobilization and utilization of surpluses in the war production program, the Navy set up material redistribution offices throughout the country. Their job has been: (1) To plow back into the war effort all excesses of usable material; (2) to investigate means of disposing of such material in the manner most beneficial to the economy of the country. At present, Commander Heinrich says, such material can usually be plowed back into the program with a consequent direct reduction of the public debt.

Only as a last resort is such material disposed of on public bid, and under the present program only a minimum of material has been so disposed of, the minimum constantly having been reduced to date through careful research to develop new uses.

Here's how the program works. The supply officer of a naval activity, a Navy prime contractor or a Navy sub-contractor finds that he has an excess amount of a given item.

Constant inventories, which are forwarded to Commander Heinrich, bring to light the excess of, for example, brass pipe. His staff scrutinizes the production program for a possible use elsewhere of brass pipe. It might be found that the pipe in question is badly needed or could be adapted to use by another activity or contractor. At the same time the excess is published in a catalog listing all such excesses.

The catalog is sent to the procure-

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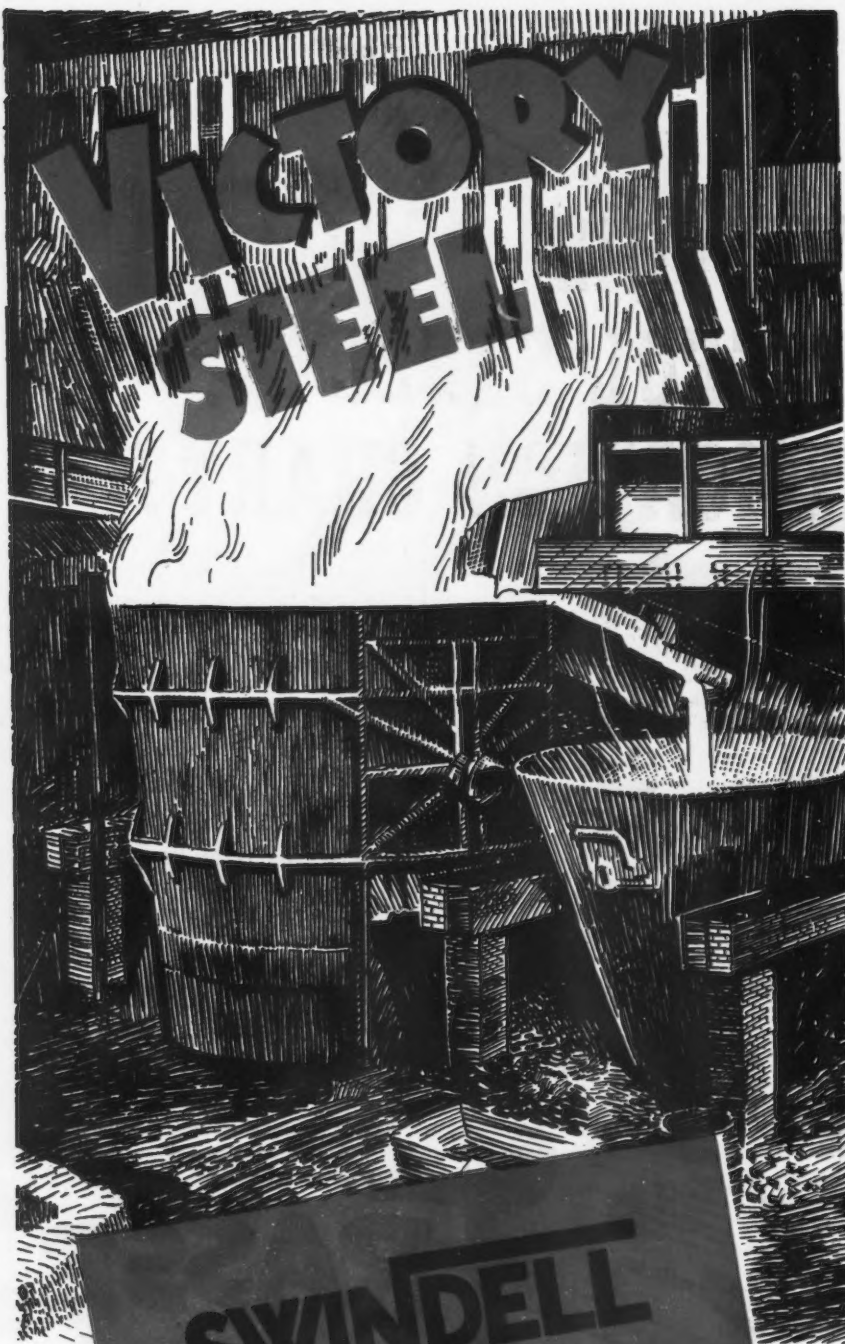
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WAR
BONDS!

NEWS OF INDUSTRY

ment officers of the Navy, Army, Marine Corps, Coast Guard, and Maritime Commission, who in turn check the item against their needs for brass pipe or equipment in which brass pipe could be used. One of these agents probably will find that a contractor in another part of the country needs the pipe and is planning to meet his needs through an additional purchase.

The agent informs the contractor that the pipe is on hand at another plant or activity. Under the program the price obtained for such redistribution material must be within the price policy of the Surplus War Property Board. In the Fourth Naval District Commander Heinrich has been able to achieve a return of 99½ per cent of cost price so far in the redistribution program.

If the pipe had been unusable it would have been turned over to the Navy Material Redistribution and Disposal Administration for disposal on public bid, the highest bidder receiving the pipe at his figure, regardless of cost value. If it had been a usable but nominal amount (under \$2500 worth), it would have been turned over to the Naval Material Redistribution and Disposal Agency for disposal at the best price obtainable.

In either case it would probably go at less than cost price and at a loss to the government.

If 50 days after publication in the catalog no means of utilization has been found, they are declared excess to the war effort and are turned over to disposal agencies. The 50-day limit is fixed so that the excesses may not be idle for more than a reasonable period. Also the plant of a contractor is cleared of termination inventories within this period so that his entire production facility can be employed to manufacture other much needed war materials.

In the case of capital equipment, such as machinery, jigs, dies, etc., the equipment is finally turned over to the Reconstruction Finance Corporation, which attempts to plow it back into consumer goods manufacture. In the case of consumer goods material, it is finally turned over to the Procurement Division of the Treasury for similar disposal. Nominal amounts are disposed of on a bid basis by the Naval Material Redistribution and Disposal Agency, with headquarters in New York, redistribution in this sense meaning redistribution to the civilian economy and



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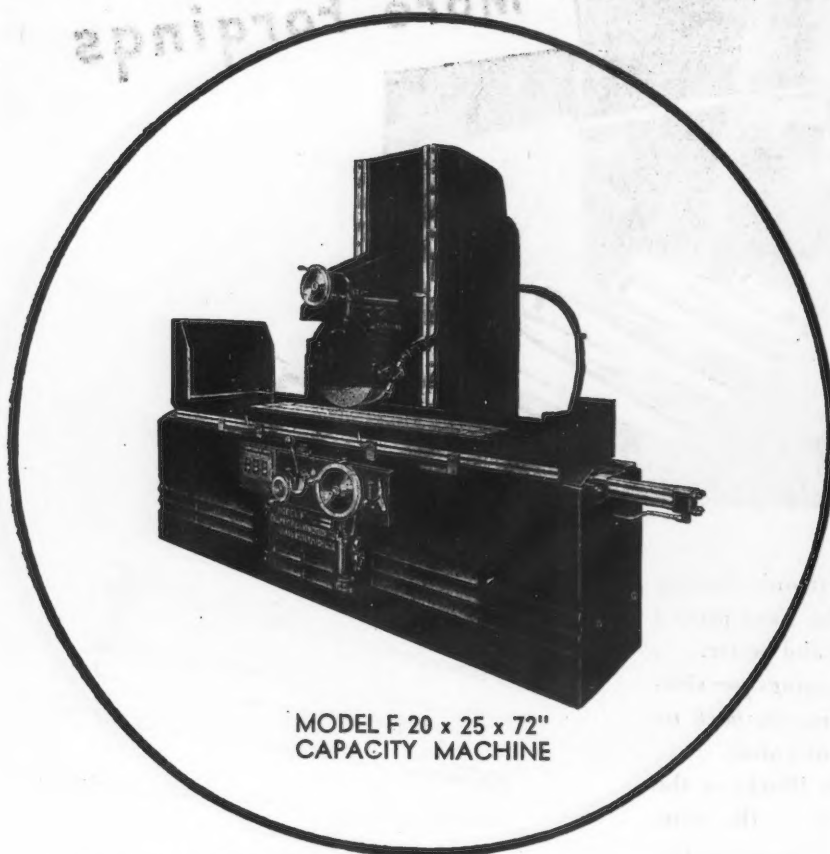
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NEWS OF INDUSTRY

not reemployment in the war production program.

The secondary (at present) function of material redistribution officers is more far-reaching than the primary and eventually the chief emphasis will be placed upon what is now a secondary consideration. This function has to do with the vital re-conversion for peace, and these officers will play a vital part.

Commander Heinrich pointed out that the time will come when it will be impossible to plow material back into the war production program because victory is in sight and more and more material will be found to be excess in war production.

Long-range plans must of necessity dictate that this material be placed back in civilian economy in such a way as to hold unemployment to a minimum and provide a maximum of civilian goods.

The Navy's material redistribution officers screen and catalog all material in the Navy's production program except that for plane production. Excesses of the Bureau of Aeronautics are handled direct by bureau representatives.

Ross Act Extension

Effective at Once

Columbus, Ohio

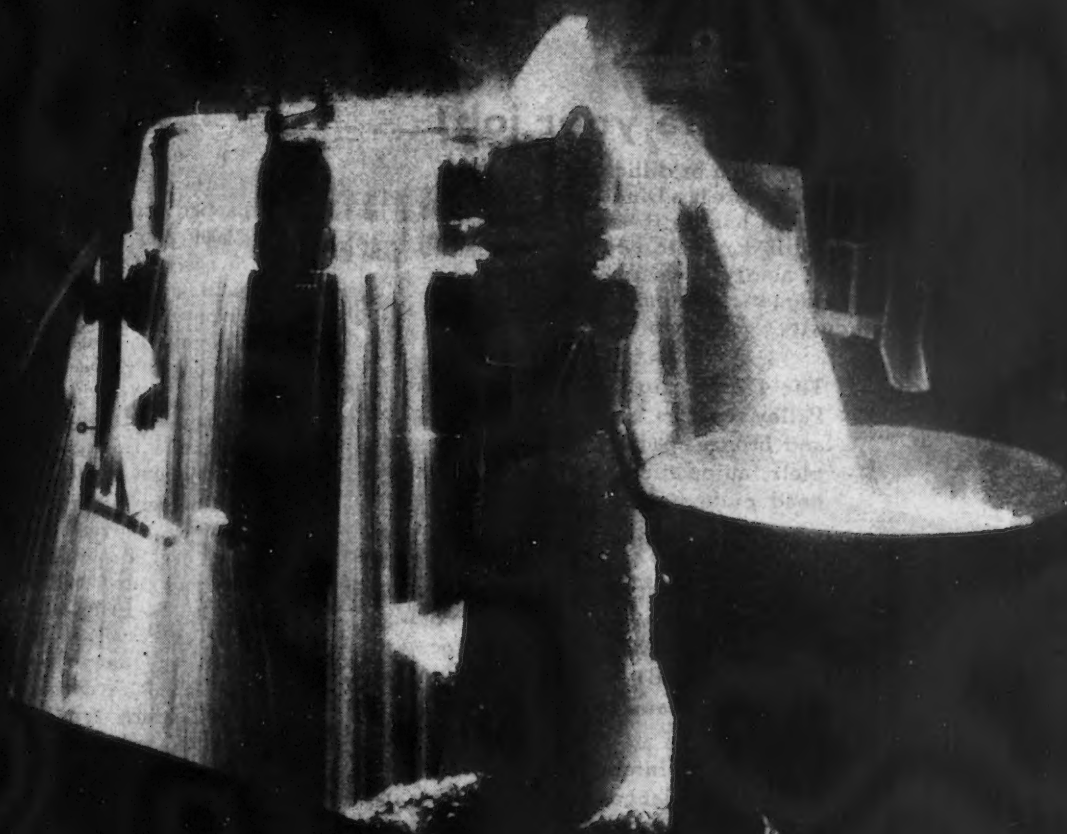
• • • Enactment of legislation extending the Ross Act for two years, relaxing the laws regulating the employment of women and minors, was completed recently when the Ohio House approved, 113 to 17, an emergency clause making it effective immediately. Ninety-one votes were needed. The bill was signed immediately by Governor Lausche.

Without the emergency clause, on which the house had balked, the extender bill could not have become effective until the elapse of 90 days. Re-enactment of the Ross Act terminated a hiatus of two and a half days in which war plants were required to revert to the peacetime maximum of 45 hr. a week for women.

The house vote of 113 to 17 on the emergency clause contrasted with the vote of 83 to 36 by which the house rejected the provision previously. Members of the house Democratic minority had opposed the clause at the request of labor organizations, who were displeased because the senate rejected an amendment prohibiting girls of 16 and 17 from working after 10 p. m. The Ross Act allowed them to work until 11 p. m.

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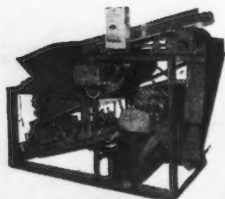
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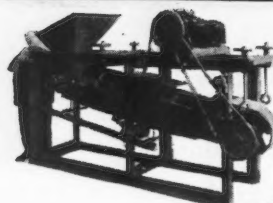
The Dings High Intensity Magnetic Pulley utilizes air-cooled construction and bronze spacer rings to provide complete, automatic separation. For use as head pulley in a belt conveyor system.



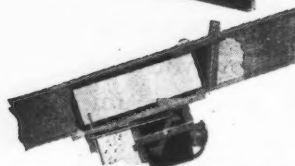
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Sees Grave Vaults And Caskets as Potential Postwar Steel Market

Pittsburgh

... In a search for postwar markets for steel, a closer examination of the grave vault and the casket markets might well be undertaken by the steel industry. This is an end use of steel that has never been well exploited by the industry, despite the fact that such companies as American Rolling Mill Co., with its ingot iron and the U. S. Steel Corp., have in the past done somewhat of a selling job.

Prior to the war, the industry was participating to the extent of about 62,000 tons of steel a year, or about 25 per cent of the potential in grave vault and casket manufacture. Participation was to the extent of 18 per cent of the total caskets produced, and only 6 per cent of the vaults produced. Steel going into caskets amounted to approximately 29,000 tons, and that going into vaults totaled about 33,000 tons.

However, as the war got underway, steel was barred from use in production of these items. Consequently, concrete vault manufacturers, while limited to 10 lb. of steel to a vault, had practically an unlimited field. However, the war caused deterioration in this product too, since the wire mesh, which had been fairly heavy, was reduced almost to chicken wire and the finished product was not as substantial as it had been formerly.

Currently, there is considerable interest in new materials for casket manufacture. Aluminum is being put forth as one of these materials, as are various types of plastics. Furthermore, wood people are again trying to rejuvenate interest in this product. Of course, concrete never even slumped in demand as a burial material.

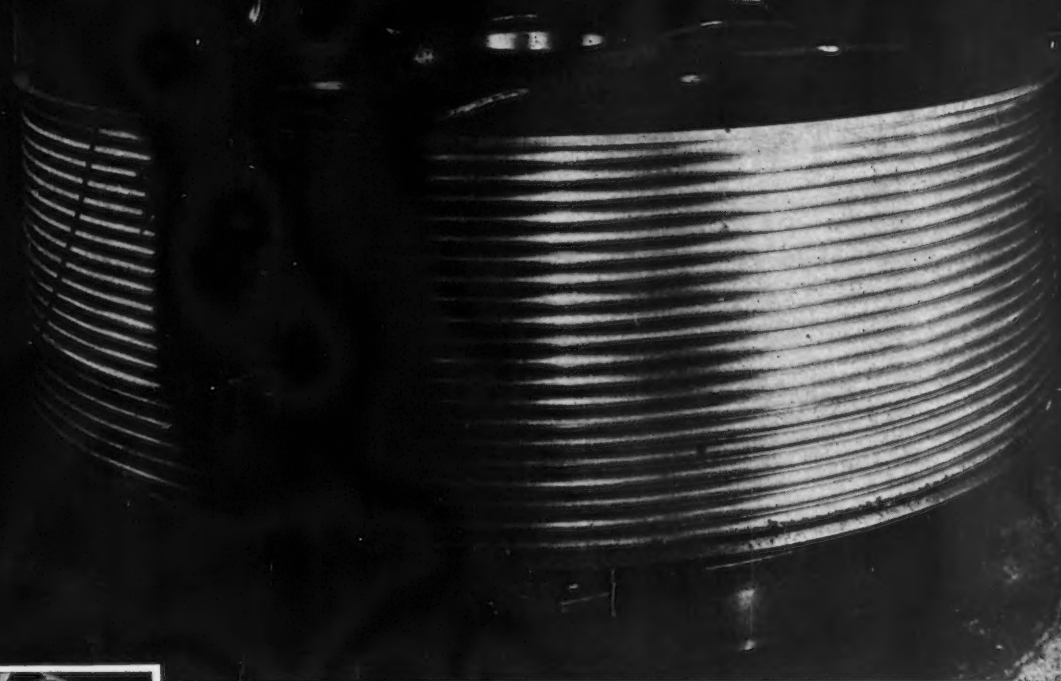
There is, and has been, considerable research going on along the lines of producing better finishes. Just before the war, one of the leading vault companies successfully produced and marketed a steel burial vault with a heavy zinc coating on the outside. Two other companies had worked on the possibilities of porcelain enameled coatings. Other companies, in collaboration with university research laboratories, have developed finishes that are not only beautiful but protective as well.

Before the war, casket producers had largely standardized on 20 gage

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LARGE

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This rope drum for a vertical lift bridge runs to size—about 25 tons. You can appreciate its dimensions and the machining job it entailed from the photos, and you can also get an idea of the clean soundness of the metal structure. What you can't see is the fact that every pound of it had to be—and is—completely stress-relieved. PSF has all the advanced technique and facilities needed for any steel casting production, no matter how involved. Call them into play on your problems.



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THE IRON AGE, April 19, 1945—141

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Corporation

NEWS OF INDUSTRY

long terne sheets. There has been an increasing demand for heavier gages, namely 18 and 16, for heavier caskets. Vaults before the war were mostly made of 12 gage hot rolled steel, but here, too, demands were also calling for gages ranging from 12 up to thicknesses approximately 7 gage.

In steel vault production, distribution has always been a problem. Most of these have been fabricated in the southern Ohio area, and, by reason of long freight hauls to other parts of the country, their use has been restricted. On the other hand, concrete vaults were made all over the country in practically any cement mixer's back yard. Distribution was mainly one of calling a local producer and getting quick truck delivery.

However, there has been a recent tendency of cemeteries to stock grave vaults, which is a definite trend toward better distribution of steel vaults. Cemeteries could buy these units in car load lots and sell them at retail as needed. They would always be on hand, and afford a type of distribution that could not be duplicated by the cement vault builders, since handling of the latter would be considerably more difficult and breakage would be an important factor.

Conceivably, there is a 250,000 ton a year market for steel if it could capture all of this business. Quite obviously, it never will, but participation of 18 per cent of the caskets manufactured and only 6 per cent of the vaults is by no means satisfactory. The potential is there, but a first class selling job will have to be done before the industry's participation approximates what it should, namely about 60 to 70 per cent of both casket and vault production.

AC Spark Plug Produces 300,000th .50 Caliber Gun

Flint, Mich.

• • • The AC Spark Plug Division of General Motors Corp. has produced its 300,000th .50 caliber Browning machine gun, having been in mass production on that item since early 1941.

General Motors announced last November that its various divisions engaged in output on this job had produced a million units up to that time. In addition to work done on assemblies at AC, The Brown-Lite Chapin, Frigidaire, and Saginaw Steering Gear Divisions have all been engaged in this work.



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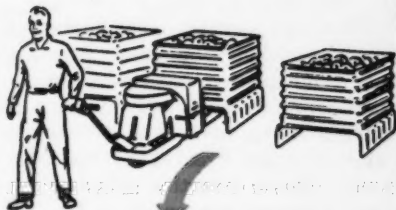
Tons transported all along the production line speedily and only - - - - -
ONE TRUCKER NEEDED

NO STRAINING

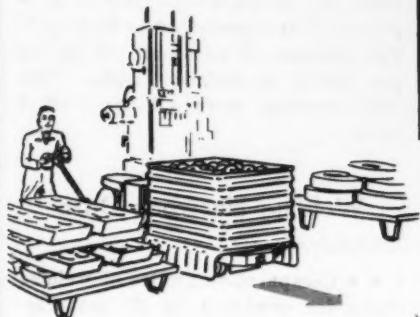
NO PULLING

NO TUGGING

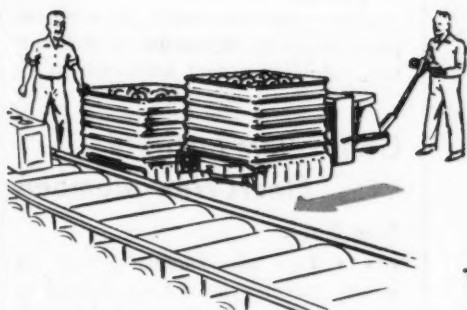
NO PUSHING



STEP I—Skid loads from production are quickly dispatched using one man or woman with "TRANSPORTER."



STEP II—Assembly machines 10 to 25 feet apart are easily served by using "TRANSPORTER." Narrow aisles can be readily maneuvered.



STEP III—Finished products are quickly moved from assembly to final packing marking and strapping line with "TRANSPORTER" operations.

TRANSPORTER PLATFORM LIFT TRUCKS

★ Results: Reports show 100 to 500 tons of material per day can be easily handled and dispatched by using one man or woman with "TRANSPORTER."

The "TRANSPORTER" is easy and safe to operate with thumb tip controls in steering handle for safe walking speeds. Electric motor is powered by heavy duty battery and mechanically drives front wheel at any steering angle. Brake is mechanical and positive with automatic emergency control. Lift has shockless hydraulic operation with easy foot lever controls.

This lift truck is designed to serve all industry for economical and safe lifting—spotting, and short hauling of various loads of raw materials and finished products on skid platforms up to 6000 lbs. and on pallets up to 4000 lbs.

Write for Bulletin No. 8

MANUFACTURERS FOR OVER 30 YEARS *Electric Propelled* INDUSTRIAL TRUCKS



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INDUSTRIAL TRUCKS
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AUTOMATIC TRANSPORTATION CO.

75 WEST 87th STREET

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Division of the Yale & Towne Manufacturing Company

The improved UDYLITE BRIGHT NICKEL

- High speed plating
- A wide range of bright plate
- A fast rate of brightening
- High tolerance to impurities
- Simplicity of operation
- Ease of control
- High ductility
- Excellent corrosion resistance
- Wonderful "eye-appeal"

Udylite's Improved Bright Nickel has many unique advantages and economies. It not only affords protection for your product but glamorous "eye-appeal" as well. Many manufacturers have already made arrangements for Udylite Bright Nickel on their postwar products. An investigation of this improved finish will be worth your while.

Write for our new Bright Nickel Bulletin

THE UDYLITE CORPORATION
1651 EAST GRAND BOULEVARD • DETROIT 11, MICHIGAN
REPRESENTATIVES IN ALL PRINCIPAL CITIES

Reports 1944 Earnings Drop to \$10,751,369

Pittsburgh

• • • National Steel Corp. total sales in 1944 amounted to \$252,357,463, which was slightly under the all-time peak established in 1943, according to the company's annual report.

Earnings for the year, after all charges including interest, depreciation and depletion, federal income and excess profits taxes and provision of \$2,000,000 to cover the retroactive wage liability created by the War Labor Board directive affecting the steel industry, amounted to \$10,751,369, or \$4.87 per share on 2,206,392 shares of capital stock. This compares with earnings in 1943 of \$11,698,362, equal to \$5.30 per share. Dividends were paid at an annual rate of \$3.00 per share and amounted to \$6,617,526. The balance of earnings, \$4,133,843, was added to earned surplus. The 1944 earnings were 4.3 per cent of sales.

Welding Electrode Data

Milwaukee

• • • Comparative grades of welding electrodes produced by 22 manufacturers together with their relationship to AWS and AISI standards are indicated in a chart issued by Allis-Chalmers Mfg. Co., Milwaukee.

This eight-page bulletin contains information on stainless steel and hard surfacing electrodes as well as the mild steel type. A section is devoted to a typical weld deposit analysis of stainless steel electrodes, showing the percentages of chromium, nickel, carbon, columbium, and molybdenum.

Controllers Institute Elects New Members

New York

• • • Five new members from the metals industry have been elected by the Controllers Institute of America. Royal G. Parks, controller of the National Malleable and Steel Castings Co., and Frank T. Humiston, Jr., comptroller of the Brush Beryllium Company, both of Cleveland, Ohio; Louis J. Bachand, controller of Metals Disintegrating Company, Inc., Elizabeth, N. J.; Donald E. Castle, controller of the Northwestern Steel & Wire Company, Sterling, Ill.; and Arthur J. Sowers, treasurer of The Spun Steel Corporation, Canton, Ohio.

*Some Day
you will want*

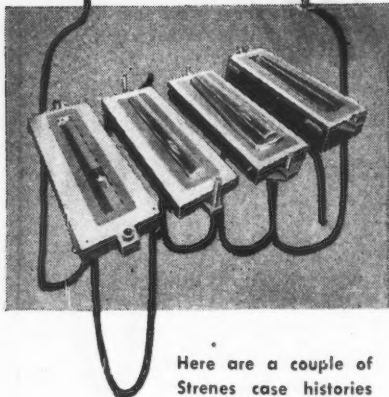


POLLAK MANUFACTURING COMPANY

Arlington, New Jersey

**DEVELOPING • DESIGNING • MACHINE WORK • SPINNING
GAS AND RESISTANCE WELDING • STAMPING • ELECTRICAL WORK**

STRENES METAL POINTS THE WAY



Here are a couple of Strenes case histories that may suggest a way to reconvert to civilian production a little faster.

Tractor Top-Dies

Strenes Metal—cast-to-shape—was specified for stamping tractor hood tops. An accurate cost check showed a saving of around 50% in machining time due to the cast-to-shape construction. On re-conversion tooling rush, such a saving will be highly advantageous.

Hydrator Pan Die

Dies of Strenes Metal stand up, too. One refrigerator hydrator pan die, for instance, stamped 2,000,000 parts with a 3½" draw out of .50 material. And, due to the self-lubricating property of the metal, stoning and polishing operations were virtually unnecessary.

Both for civilian and war products, Strenes Metal has been a definite help on many tooling programs. Facts and figures on request. Write today.

Strenes Metal for drawing and forming dies.

The Advance Foundry Co.
100 Seminary Ave.
DAYTON 3, OHIO

Strenes METAL

FEATURE CONTINUATION

Managerial Use Of Time Study

(CONTINUED FROM PAGE 71)

use of extended production studies, to uncover the cause of the trouble and make recommendations for its solution.

6. Using his knowledge of plant capacity and his time study data for each machine, the time study engineer can fill an important place at the planning and budgeting conference. He should be able to come up with pertinent data for use by management in planning from the expansion of present facilities to the complex problems of reconversion. When the question of whether to manufacture or sub-contract comes up he is in a position to supply the needed facts. Similarly, he should be consulted as to hours of work, number of shifts and questions related to operation at various levels of plant capacity.

7. The purchase of new equipment with the necessary considerations as to its merits compared to existing equipment is a field in which the time study engineer is well qualified to do research for management. He knows present equipment thoroughly and is usually well versed on the new types and processes which are appearing in the field.

Personnel Classifications

8. One of the chief assets to management and one of those most frequently overlooked is the time study engineer's value to management in the field of personnel administration. He has already made a thorough job analysis of every job performed by every worker in the plant. Thus, he has in his files a detailed job description to fit each category of work. This is a sound basis coupled with his judgment for the establishment of wage classifications, merit rating systems, individual job requirements, automatic wage increase plans, apprentice periods, factory lines of promotion, amount of personnel necessary in each department to man the plant at various levels of capacity, filing of manpower questionnaires and replacement schedules for Selective Service purposes.

9. Another possibility not to be overlooked is the place of the time study engineer in the increasingly time consuming field of industrial relations. Due to the nature of his work he comes to know a large segment of workers personally and close contacts

Send me this VALUABLE NEW SERVICE

—which I understand will help me to use Arc Welding to better advantage.

NAME

POSITION

FIRM

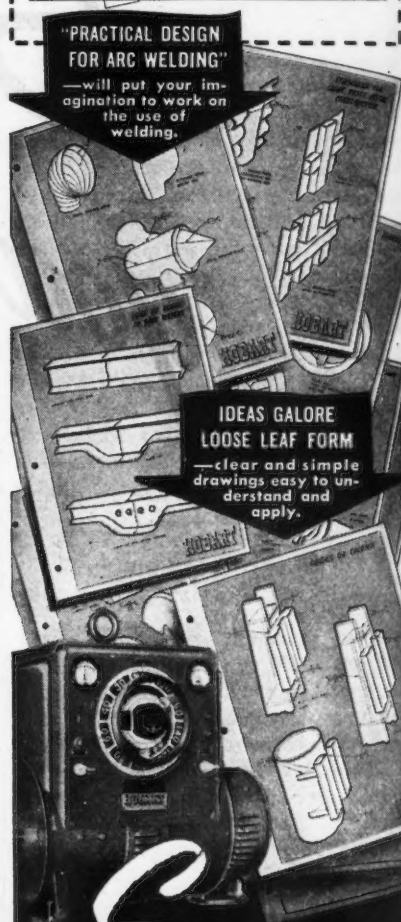
ADDRESS

"PRACTICAL DESIGN FOR ARC WELDING"

—will put your imagination to work on the use of welding.

IDEAS GALORE LOOSE LEAF FORM

—clear and simple drawings easy to understand and apply.



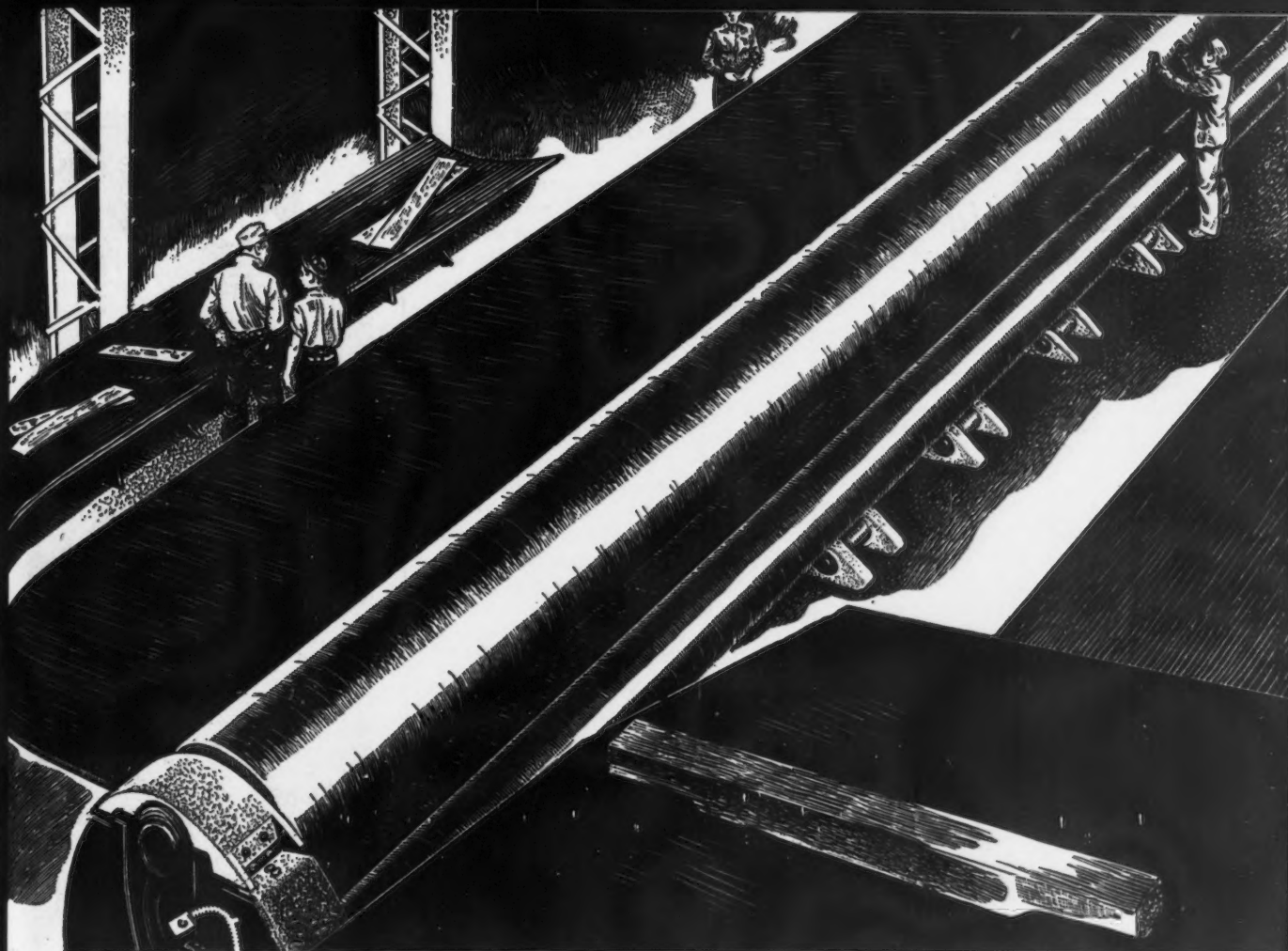
Simplified ARC WELDING

Now is the time to plan to use welding on your future production—to take advantage of experiences gained—to cut costs and yet build a better, stronger product. "Practical Design for Arc Welding" can help you plan. Ask for this service today.

HOBART Bros. Co.

Box IA-433, Troy, Ohio, U.S.A.

One of the World's Largest Builders of Arc Welders



Hatching a **HEAVYWEIGHT**

...Huge Plate Roll Fabricated By Thermit Welding

You're looking at a large bending roll that functions above two smaller bottom rolls as a unit for forming steel plate. Fabricating this heavyweight roll threatened for a time to be a major difficulty. Few foundries were available that could make a single casting of the required size: 38 feet long by 31½ inches in diameter and 50 tons in weight. The problem was solved by making two castings of about 25 tons each and uniting them by Thermit welding.

It's Thermit welding's ready adaptability for such heavy tonnage jobs that makes it so suitable a

process for both fabrication and repair of large castings and forgings.

Thermit welding joins smaller parts into large units to save time, money, shipping and handling problems. There's no limit to the size of a Thermit weld—no need for pre-heating or stress-relieving—no need to worry about the strength or permanence of the weld, for it's as strong as a forging of the same cross-section. And Thermit welding can be done in your own plant, by your own crew, under M & T supervision, or at the following Metal & Thermit Corporation Branches: Jersey City, New Jersey; Chicago, Illinois; Pittsburgh, Pennsylvania; or South San Francisco, California.

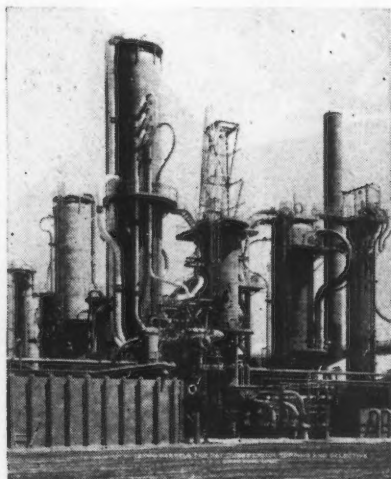
Thermit  **Welding**

Industries Turning To Galv-Weld Alloy

By GEORGE H. OHMER
Chief Engineer

Dayton

• • • The increased use by railroads and the air conditioning, electric power and petroleum industries of the new patented Galv-Weld Process of regalvanizing welded seams and joints in galvanized sheet, plate and pipe, is attracting widespread interest.



PETROLEUM INDUSTRY is finding many uses for the Galv-Weld Process in maintenance and new construction work.

Production-proved in wartime service, this new process makes available all-welded galvanized steel construction by providing 100% protection against rust and corrosion at the point of weld. It is being widely applied to the construction and repair of water tanks, signaling systems and towers, steel work buildings, piping and in the maintenance of refinery equipment in place of periodic painting. The Galv-Weld Alloy is not affected by the corrosive and acid-bearing fumes in refinery areas.

All-welded galvanized steel buildings for farm and industry, bridges, and towers have been made feasible, while the Galv-Weld Process is a "must" for underground storage tanks where protection against corrosion is paramount.

Commercial galvanizers also are finding that Galv-Weld Alloy saves considerable time and money in salvaging rejects that otherwise would be stripped and re-hot dipped. Fractures in galvanized coating, due to forming, are easily regalvanized with Galv-Weld.

The Galv-Weld Process is fast, permanent, requires no flux, produces no fumes, and requires no sand or grit blasting.

Manufacturers are invited to submit samples of products for producing examples of how they can be Galv-Welded. There is no cost for this laboratory service. Details may be secured from Galv-Weld Products, Dayton 10, Ohio.

with shop conditions cannot help but keep him apprised of shop feeling towards management. His department should be considered a vitally concerned unit of the organization, and one qualified to take its place beside the operating departments in the formulation of successful labor relations policy.

10. The time study department has a significant part to play in the field of research. Its files contain process flow charts, man and machine charts, formulas and records of individual elements as well as job analyses which can be used in calculating the desirability of producing a new product in the plant.

All Production Phases

11. Finally, the time study department is a rich source of material for top management positions. Possibly no other department in the plant contains men so thoroughly schooled in the important phases of management—production, standards, personnel and industrial relations, scheduling, cost analysis, job training, work simplification, estimating, job evaluation, methods improvement. The time study engineer must work daily with workers of all types—with foremen, technical men, accountants, shop stewards, and with management. In his role in production, he must constantly make decisions—for he is in reality an umpire. Often, he is regarded by workers as the symbol of management and must explain and defend company policy to them. To continue long in his work, he must develop a sense of accuracy and of fairness. His intimate contact with all sections of the organization familiarizes him with the functions of each and he is generally aware of many organizational weaknesses.

Much of the use which top management can derive from the time study department is dependent upon the place in the organizational setup which is allocated to it. This may vary from the industrial engineering or standards department reporting directly to the executive vice-president to the local "rate setting" department working under the production manager with all rates subject to foreman approval. Provided management will give the time study department its proper position and authority, completely forgetting its standards setting function, any management can find this department a valuable aid in its search to reduce costs and improve efficiency through scientific management.

Screw
Machine
Products

U.S. AUTOMATIC
CORPORATION
AMHERST ★ OHIO



Chicago Detroit New York



A Plant **WITH A FUTURE!**

This plant—and maybe it's yours—is today producing war goods with far greater speed and efficiency than the average. When normal operations are resumed, it will still be out in front.

Manufacturers who know the wartime advantages of swift, dependable materials handling with P&H overhead cranes are also alert to their peacetime applications. The controlled manufacturing costs that these cranes make possible will help win and hold markets. Modern handling methods will broaden postwar product opportunities; help create more jobs for workers.

Long years of satisfactory crane service

are insured for any plant by bringing heavy materials handling problems to P&H. You get the sound counsel of America's oldest, largest and only crane builder producing complete electrical crane equipment. The significance of such counsel is in the fact that P&H cranes installed up to 50 years ago are still in operation, and that for 60 years P&H has always pioneered in crane development. Your inquiry is invited; address the Crane Division.

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4401 West National Avenue,
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HOISTS • WELDING ELECTRODES • MOTORS

Established in 1884

MACHINE TOOLS

... News and Market Activities

Rated Orders for Automobile Tools Pose Some New Complications

Washington

... As an abeyant reconversion nears, it is already apparent that machine tool builders will have on their hands more than a modicum of complications. WPB's recent assignment of priority to \$50,000,000 worth of "bottleneck type machine tools" for the automobile industry arrives at a moment somewhat inopportune and is certainly only the beginning.

Admittedly, the car makers have a reconversion problem that is as large as it is important and involving probably the largest single amount of potential reconversion employment. But, it is not the policy of WPB to issue ratings on machines for reconversion. However, in cases where a few machines are critically needed they will, apparently, apply the ratings.

There is no indication here that other industries will go in for ratings, inasmuch as no other industry is in quite the same pickle as the automobile people. The word is that WPB is concerned lest this be considered a new policy but they wanted the automotive people to get started and are now issuing the ratings.

Automobile builders have listed the machines they need on Form WPB

1319 and putting the machinery in motion seems to be quite simple. The customer merely goes to a machine tool builder and puts a priority rating on his order. The machine tool builder then gives a delivery date which at this time may be still quite far in the future. Then the customer goes to WPB in the event the delivery date is not satisfactory, and states his troubles. WPB then gets busy with the builder to see if diversion is indicated.

Many observers thought that the machine tool business would be relatively localized in a few plants making highly specialized machines, but such is not the case, since standard as well as special purpose equipment is being bought. According to the official word from WPB all of these tools have a "long lead time" and will require from three to seven months for fabrication after they are scheduled by the builders.

Since most of this equipment has been on order with machine tool builders since last fall on an unrated basis, there are no indications that the industry will be getting anything from the surplus. The Army had frozen the surplus about the time some of these orders were placed and would

not sell to anybody but a war contractor. The automobile companies, obviously, have machines in their own plants that they should be allowed to buy on option but that is a long drawn-out process at present.

It is thought here that there will be only a limited list of orders for the automobile industry that will get a rating and that cancellation of orders intended for the munitions program will grow and spread, since there is serious doubt around here as to whether any of the new plants for the munitions program will be completed.

National Tool Shows Loss

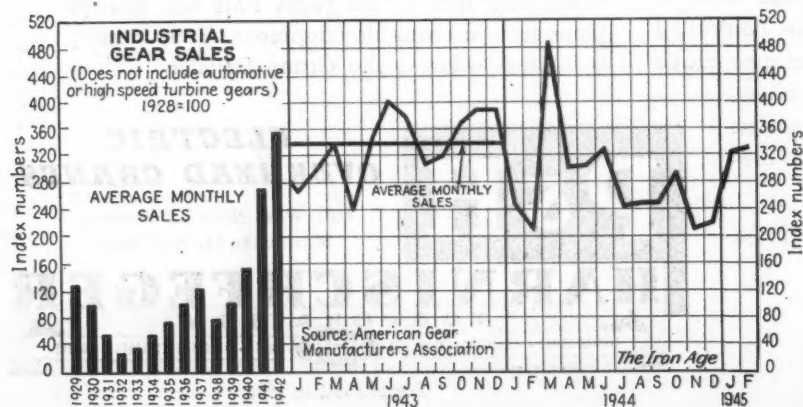
Cleveland

... National Tool Co. operations in 1944 showed a net loss of \$17,635, but nonrecurring credits of \$132,683 from tax refunds and proceeds from officer's life insurance brought net profit to \$115,048, or 51 cents a share, compared with \$146,106, or 65 cents a share in 1943.

Sales during 1944 totaled \$2,502,218, compared with \$3,765,633 the previous year. Drastic reductions in government orders for war munitions, increasing labor costs and the absence of peacetime work to replace war business adversely affected operations and earnings, according to president Samuel J. Kornhauser, in his report to the stockholders. Renewed demand for war munitions has increased the company's backlog of business to the highest level since August, 1943, he stated.

February Gear Sales Increase

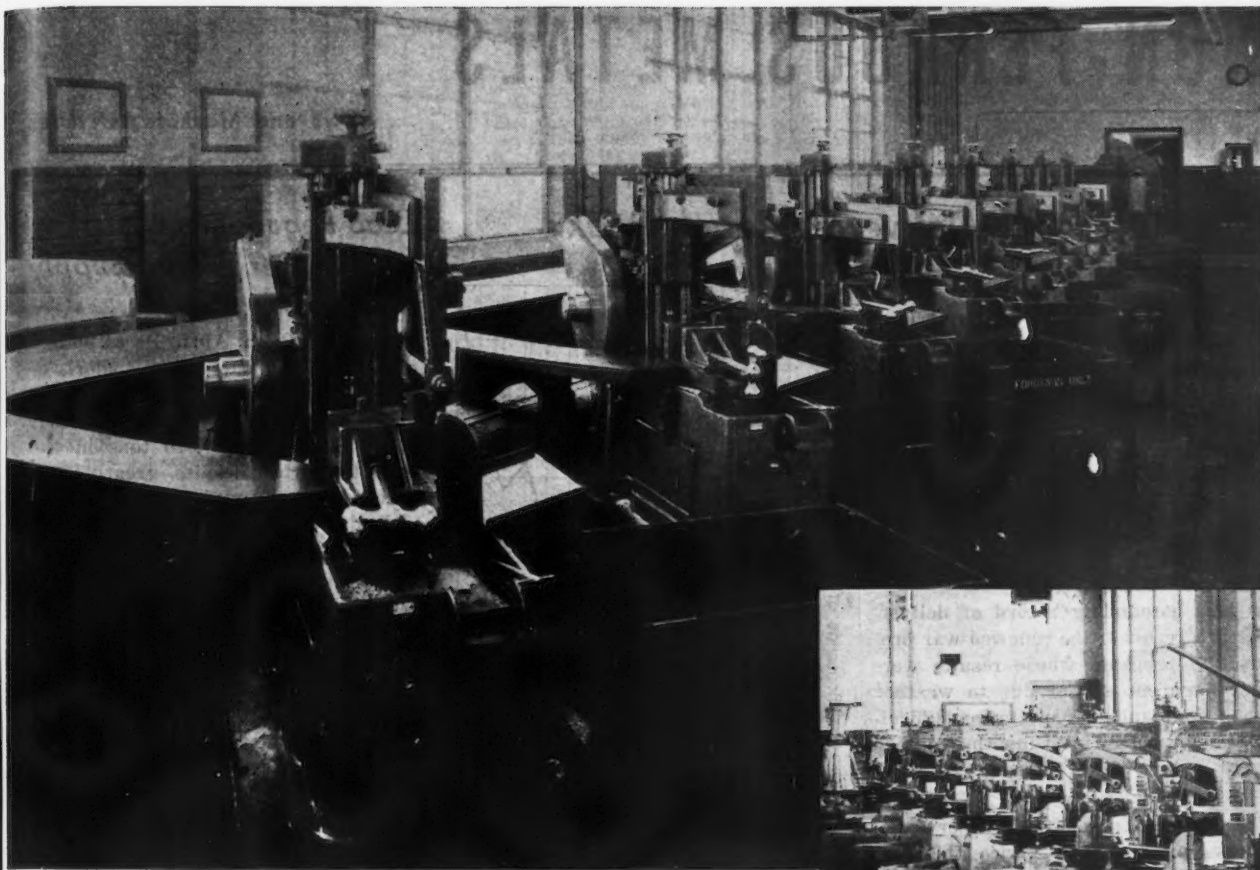
... The gearing industry, as represented by the members of the American Gear Manufacturers Association, shows an increase in volume of sales for February, as compared with January, of 2.5 per cent. This report does not include turbine or propulsion gearing. The index figure for February was 331.



Sales of Surplus Machine Tools

Boston

... Recent RFC sales of surplus property included two platen presses with accessories to the U. S. Rubber Co., Rhode Island for \$970; 250 lb. of strip steel to Coro, Inc., Providence for \$17; two vertical milling machines, \$2945.80; a South Bend lathe, \$350; a Prentice lathe, \$300; two milling machines, \$1,500 to the Industrial Tool & Engineering Corp., Taunton, Mass.; and two lapping machines, \$1,100 to American Jewels Corp., Attleboro, Mass.



Where Speed Counts Most!

Increased steel production and more rigid inspection during the war has made it necessary for metallurgical laboratories to require hack saw machinery for specimen cutting of a wide variety of metals and alloys of almost any shape or size—in any condition of hardness.

The photos shown here illustrate how one large steel mill in the middle west has installed a battery of Marvel Hack Sawing Machines to crop and cut-off slices for metallurgical tests of large billets of tough alloy steels. This company, along with many other steel companies, has found that the Marvel Machine is the only one capable of cutting the hardest alloys fast and economically. The Marvel is the most universal cutting-off machine, built for heavy duty, continuous operation.

Marvel Saws increase production by rapidly, accurately and economically cutting-off the toughest steels in cross sections up to 24" x 24". If you have metal sawing problems, Marvel Sawing engineers are available to discuss and analyze your cut-off work—to recommend methods and equipment.

ARMSTRONG-BLUM MFG. CO.

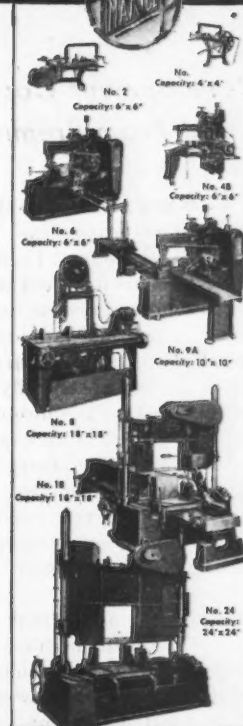
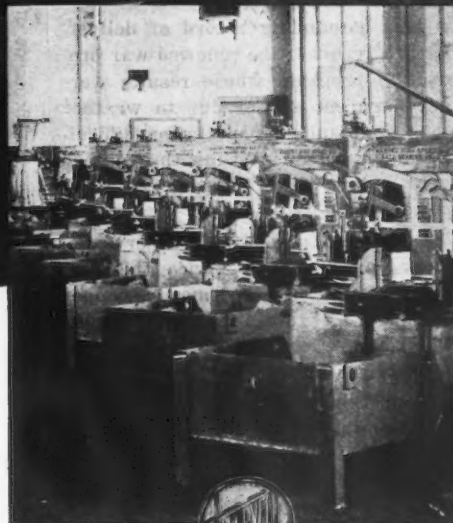
"The Hack Saw People"

5700 W. BLOOMINGDALE AVE.

CHICAGO 39, U.S.A.

Eastern Sales Office: 225 Lafayette St., New York 12, N. Y.

MARVEL SAWS



NON-FERROUS METALS

News and Market Activities

March Copper Deliveries Reach Peak

New York

... Copper deliveries in March have reached the peak figure of 218,488 short tons, according to statistics released by the Copper Institute, which approaches the 257,846 tons delivered during the entire year of 1932. Refinery production during March aggregated 76,395 tons, a rise from the January and February lows but considerably below the peak of production in July, 1943, 105,589 tons.

This astounding record of deliveries is a result of the renewed war production program whose results were not apparent earlier due to weather conditions and transportation difficulties during the winter months, coupled with a long term shortage of manpower.

Deliveries from Metals Reserve Co. stocks approximated twice the tonnage coming from domestic copper refineries, a total of 142,093 tons. This figure represents principally foreign production.

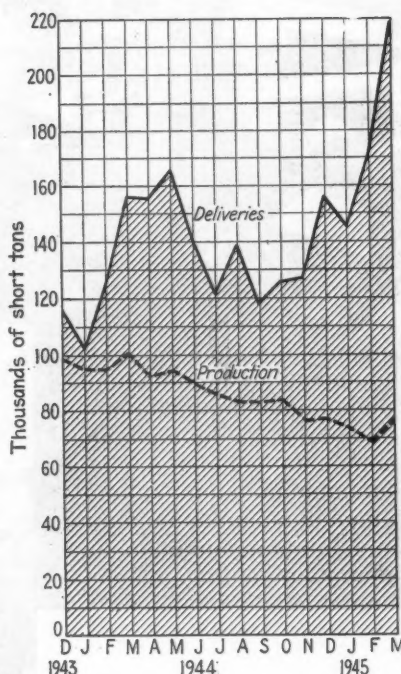
Copper producers report that deliveries during April and May will be well below the March figure, and that deliveries during the latter month may not involve a reduction of the copper stockpile.

Mine Development Cost Excluded From Premiums

Washington

... The WPB has advised the Quota Committee administering the Premium Price Plan for Copper, Lead and Zinc that effective April 14 and thereafter amortization charges for capital expenses made after that date are not to be allowed as costs in calculating metal quotas, unless specifically authorized in advance by the appropriate WPB metal division. Capital expense is defined to mean expenditures covering long range development, exploration and prospecting, construction of new mining or processing plants, and expansion of present mining or processing facilities.

WPB officials explained that this action is being taken because the present manpower shortage renders it inadvisable to expend manpower on new mining construction or other



capital undertakings, including long term prospecting, exploration and development. Special consideration, however, will be given to authorizations for projects upon which substantial amounts have already been spent.

Tungsten Further Restricted

Washington

... WPB has separated the controls imposed on tungsten and molybdenum effective April 10, by the issuance of a new order, M-369a, which applies to tungsten only. Increased war demands for tungsten have necessitated restrictions on the metal which do not apply to molybdenum.

The new order does not materially alter the basic restrictions on tungsten but it does add the following controls: Tungsten compounds from which tungsten powder is made have been placed under the restrictions of the order; intracompany deliveries have been further restricted; transactions of 100 lb. or less contained tungsten in the form of tungsten compounds or powder in any calendar month are exempted.

Lead Requirements Far Exceed Supply

Washington

... WPB on April 16 estimated that the lead supply fell short of minimum requirements by 19,000 tons in the first quarter of 1945 and that it will fall short 25,910 tons in the second quarter despite greatly curtailed quotas allowed for various uses of lead.

The estimated minimum requirements for lead in the second quarter are 276,910 tons, of which 77,366 tons were allocated for storage batteries, 33,800 tons for cable covering, 26,000 tons for tetraethyl and 26,000 tons for other chemicals.

Antimony Sales Controlled

Toronto

... Sales of antimony may no longer be made except by permit, the Munitions and Supply Department has announced. The new order issued by metals controller F. M. Connell, restores the control in effect until July, 1944, under which sales and purchases of antimony could be made only by Metals Control permit. The new order also applies to antimonial lead containing 25 per cent antimony in metallic form.

Alcoa Drops Republic Mining

Pittsburgh

... The Republic Mining & Mfg. Co., a mining subsidiary of Aluminum Co. of America since 1909, has become the Alcoa Mining Co., according to announcement of Frank B. Cuff, president.

Republic is said to have been the first company in the United States to mine bauxite. Their operations are carried on in Arkansas, Georgia, and Alabama.

No Copper Lend-Lease to U.K.

New York

... Officials report that copper products are no longer being sent to the United Kingdom under lend-lease, and that importation of copper ore from Rhodesia, South Africa, constitutes a lend-lease movement in reverse.

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NONFERROUS METALS PRICES

Primary Metals

(Cents per lb., unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	\$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb.)	\$1.50 to \$1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.9%, dollars per troy oz.	\$4.00
Iridium, dollars per troy oz.	\$120.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	\$160.00 to \$165.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per oz.	\$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb., unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing	
No. 2, 3, 4	\$6.00 to 9.50
Brass Ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	20.37	
Copper, H.R.		17.37	
Copper, drawn		18.37	
Low brass, 80%		20.40	20.15
High brass, 85%		20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut		15.01	
Commercial bronze, 90%		21.32	21.07
Commercial bronze, 95%		21.53	21.28
Manganese bronze	24.00		28.00
Phos. bronze, A, B, 5%		36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Hercaloy, Olympic or equal		25.50	26.00
Nickel silver, 5%		28.75	26.50
Architect bronze	19.12		

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (1/2H); 52S, 61c. (O); 24S, 67 1/2c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 23c.; 61S, factor No. 1 to 4, 28 1/2c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2c. per lb.; 1/2 in., 26c.; 1 in., 24 1/2c.; 2 in., 23c. Hexagonals: 1/4 in., 34 1/2c. per lb.; 1/2 in., 28 1/2c.; 1 in., 25 1/2c.; 2 in., 25 1/2c. 2S, as fabricated, random or standard lengths, 1/4 in., 24c. per lb.; 1/2 in., 25c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths, 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.35
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00
Zincy bronze borings	3.00
Zincy bronze solids	3.00

OPA Group 3†

Fired rifle shells	3.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.35 ¹
Manganese bronze solids	6.25 ¹
Manganese bronze borings	6.50 ¹
Manganese bronze borings	5.80 ¹

OPA Group 4†

Refinery brass	4.75*
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*Price varies with analysis. ¹Lead content 0.00 to 0.40 per cent. ²Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum

Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S	
25S	5.00
turnings, dry basis	3.00
Low copper alloys 51, 52, 61, 63S	
solids	7.50
turnings, dry basis	5.75

Plant scrap, mixed

Solids	4.00
Turnings, dry basis	2.50

Obsolete scrap

Pure cable	3.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	5.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unswaged zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under 1/2%, 36c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25 1/2
Electrolytic	22 1/2
Rolled, oval, straight	19 1/2
Curved	20 1/2
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23 1/2
Zinc, cast, 99.99, 15 in. or longer	16 1/2
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 1-9 troy oz., per oz.	58*

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver cyanide, 100 oz. lots	40.82*
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 39 per cent, crystals, bbls., frt. allowed	6.35

*Price based on use of foreign silver.

... News and Market Activities

New York

PHILADELPHIA — There has been some opening up in the movement of open hearth grades although several mills here are taking only small scheduled shipments. No sales contracts are being made for a period greater than 30 days. Turnings, however, are still being held up by many consumers. Scrap prices remain unchanged, although a drop in the price of turnings is expected as soon as mills here show a revival of interest in that grade.

ST. LOUIS—Some dealers in the Southwest are beginning to ship scrap iron in larger quantities to the St. Louis industrial district, but on account of rains the movement from nearby points has been slowed down a bit. The heaviest movement is from the railroads, all of which is allocated. Mills are cautious about making commitments beyond April.

CINCINNATI—During the past week brokers noted a tendency on the part of

He reported that two vessels loaded with Pacific scrap will shortly arrive at Baltimore, carrying 10,000 tons of No. 1 heavy melting.

IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4). Where ceiling prices are quoted they do not include brokerage fee or adjusted transportation charges. Asterisks indicate grades selling at ceilings.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	\$13.50 to 14.00
Short shov. turn.	16.00 to 16.50
Mixed bor. and turn.	13.50 to 14.00
Cast iron borings	15.00 to 15.50
Hvy. break. cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bl. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	16.25 to 16.75
Galv. bundles	14.25 to 14.75
Mach. shop turn.	9.00 to 9.50
Short shovel. turn.	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Mix. borings & turn.	12.00 to 12.50
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Rails 3 ft. and under	22.25*
Locomotive tires cut	24.25*
Cut bolsters & slide frames	22.25*
Angles & splice bars	22.25*
Standard stl. car axles	23.50 to 24.50
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	\$8.00 to 8.50
Shoveling turn.	9.00 to 9.50
Cast iron borings	8.50 to 9.00
Mixed bor. & turn.	8.00 to 8.50
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast	16.50*
Stove plate	19.00*
Scrap rails	21.50*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	\$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shoveling	\$11.00 to 11.06
Machine shop turn.	9.00 to 9.06
Mixed bor. & turn.	9.00 to 9.06
C'n cast, chem. bor.	13.06 to 14.15*
Truck delivery to foundry	
Machinery cast	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	\$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	\$9.00 to 9.50
Short shov. turn.	11.00 to 11.50
Cast iron borings	10.00 to 10.50
Mixed bor. & turn.	9.00 to 9.50
Low phos. plate	19.32*
No. 1 cupola cast.	20.00*
Charging box cast.	13.00 to 19.00
Hvy. breakable cast	16.50*
Stove plate	13.50 to 19.00
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle, forge turn	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	\$17.50*
Bundled sheets	17.50*
Mach. shop turn.	\$7.00 to 7.50
Hvy. axle turn.	12.00 to 12.50
Locomotive tires, uncut.	20.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	23.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	18.50*
No. 1 mach'ry cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	\$9.50 to 10.00
Cast iron borings	9.50 to 10.00
Bar crops and plate	19.50*
Structural and plate	20.00*
No. 1 cast	17.00
Stove plate	18.00*
Steel axles	18.50*
Scrap rails	18.50*
Rerolling rails	20.50*
Angles & splice bars	20.50*
Rails 3 ft. & under	21.00*
Cast iron carwheels	16.50 to 17.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	\$13.00 to 13.50
Short shovel. turn.	15.00 to 15.50
Cast iron borings	14.00 to 14.50

NEW YORK

Dealers' buying prices per gross ton, on cars

No. 1 hvy. melting	\$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
No. 1 cupola cast.	20.00*
Hvy. breakable cast	16.50*
Charging box cast.	19.00*
Stove plate	19.00*
Clean auto cast.	20.00*
Unstrip. motor blks.	17.50*
C'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	13.00
Shoveling turn.	15.00
Cast iron borings	14.00
Mixed bor. & turn.	13.00
No. 1 cupola cast.	20.00*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coll & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 2 bundles	19.50*
Mach. shop turn.	\$12.00 to 12.50
Short shovel.	14.00 to 14.50
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	13.00 to 13.50
Mixed bor. & turn.	12.00 to 12.50
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	\$15.50 to \$16.25
No. 1 hvy. melting	15.50 to 16.25
No. 2 hvy. melting	14.50 to 15.25
No. 2 bales	13.50 to 14.25
No. 3 bales	9.50 to 10.59
Mach. shop turn.	7.00
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$14.50 to \$15.50
No. 2 hvy. melting	13.50 to 14.50
No. 2 bales	12.50 to 13.50
No. 3 bales	9.00 to 10.00
Mach. shop turn.	4.50
No. 1 cupola cast.	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	\$14.50
No. 1 hvy. melting	14.50*
No. 3 bundles	11.50
Elec. furn. 1 ft. und.	17.00
No. 1 cupola cast.	20.00*

Comparison of Prices . .

Advances Over Past Week in Heavy Type; Declines in *Italics*. Prices are F.O.B. Major Basing Points. The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 158-166.

Flat Rolled Steel:	Apr. 17, 1945	Apr. 10, 1945	Mar. 13, 1945	Apr. 18, 1944
(Cents Per Lb.)				
Hot rolled sheets.....	2.20	2.20	2.20	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.65	3.65	3.65	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates.....	2.20	2.20	2.20	2.10
Plates, wrought iron.....	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate:	Apr. 17, 1945	Apr. 10, 1945	Mar. 13, 1945	Apr. 18, 1944
(Dollars Per Base Box)				
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic....	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes:	Apr. 17, 1945	Apr. 10, 1945	Mar. 13, 1945	Apr. 18, 1944
(Cents Per Lb.)				
Merchant bars.....	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars.....	2.70	2.70	2.70	2.70
Structural shapes.....	2.10	2.10	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00
Wrought iron bars.....	4.40	4.40	4.40	4.40

Wire and Wire Products:	Apr. 17, 1945	Apr. 10, 1945	Mar. 13, 1945	Apr. 18, 1944
(Cents Per Lb.)				
Plain wire.....	2.60	2.60	2.60	2.60
Wire nails.....	2.80	2.80	2.80	2.55

Rails:	Apr. 17, 1945	Apr. 10, 1945	Mar. 13, 1945	Apr. 18, 1944
(Dollars Per Gross Ton)				
Heavy rails.....	\$43.00	\$43.00	\$43.00	\$40.00
Light rails.....	43.00	43.00	43.00	40.00

Semi-Finished Steel:	Apr. 17, 1945	Apr. 10, 1945	Mar. 13, 1945	Apr. 18, 1944
(Dollars Per Gross Ton)				
Rerolling billets.....	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars.....	34.00	34.00	34.00	34.00
Slabs, rerolling.....	34.00	34.00	34.00	34.00
Forging billets.....	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp:	Apr. 17, 1945	Apr. 10, 1945	Mar. 13, 1945	Apr. 18, 1944
(Cents Per Lb.)				
Wire rods.....	2.00	2.00	2.00	2.00
Skelp.....	1.90	1.90	1.90	1.90

Latest steel interim price increase authorized by OPA effective Jan. 11, 1945.

Pig Iron:	Apr. 17, 1945	Apr. 10, 1945	Mar. 13, 1945	Apr. 18, 1944
(Per Gross Ton)				
No. 2 fdy., Philadelphia..	\$26.84	\$26.84	\$26.84	\$25.84
No. 2, Valley furnace....	25.00	25.00	25.00	24.00
No. 2, Southern, Cin'ti...	26.11	26.11	26.11	25.11
No. 2, Birmingham.....	21.38	21.38	21.38	20.38
No. 2, foundry, Chicago†.	25.00	25.00	25.00	24.00
Basic, del'd eastern Pa...	26.34	26.34	26.34	25.34
Basic, Valley furnace....	24.50	24.50	24.50	23.50
Malleable, Chicago†....	25.00	25.00	25.00	24.00
Malleable, Valley.....	25.00	25.00	25.00	24.00
L. S. charcoal, Chicago..	37.34	37.34	37.34	37.34
Ferromanganese†.....	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡ For carlots at seaboard.

Last pig iron price change authorized by OPA effective Feb. 14, 1945.

Scrap:	Apr. 17, 1945	Apr. 10, 1945	Mar. 13, 1945	Apr. 18, 1944
(Per Gross Ton)				
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia.	20.00	20.00	20.00	20.00
No. 1 cast, Chicago.....	20.00	20.00	20.00	20.00

Coke, Connellsville:	Apr. 17, 1945	Apr. 10, 1945	Mar. 13, 1945	Apr. 18, 1944
(Per Net Ton at Oven)				
Furnace coke, prompt...	\$7.00	\$7.00	\$7.00	\$7.00
Foundry coke, prompt...	8.25	8.25	8.25	8.25

Non-Ferrous Metals:	Apr. 17, 1945	Apr. 10, 1945	Mar. 13, 1945	Apr. 18, 1944
(Cents Per Lb. to Large Buyers)				
Copper, electro., Conn...	12.00	12.00	12.00	12.00
Copper, Lake.....	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	52.00
Zinc, East St. Louis....	8.25	8.25	8.25	8.25
Lead, St. Louis.....	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic.....	35.00	35.00	35.00	35.00
Magnesium, ingot.....	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex...	14.50	14.50	14.50	14.50

Composite Prices . . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue.

FINISHED STEEL	
April 17, 1945.....	2.25839c. a Lb.....
One week ago.....	2.25839c. a Lb.....
One month ago.....	2.25839c. a Lb.....
One year ago.....	2.30329c. a Lb.....

HIGH	LOW
1945..... 2.25839c., Jan. 16	2.21189c., Jan. 2
1944..... 2.30837c., Sept. 5	2.21189c., Oct. 5
1943..... 2.25513c.	2.25513c.
1942..... 2.26190c.	2.26190c.
1941..... 2.43078c.	2.43078c.
1940..... 2.30467c., Jan. 2	2.24107c., Apr. 16
1939..... 2.35367c., Jan. 3	2.26689c., May 16
1938..... 2.58414c., Jan. 4	2.27207c., Oct. 18
1937..... 2.58414c., Mar. 9	2.32263c., Jan. 4
1936..... 2.32263c., Dec. 28	2.05200c., Mar. 10
1935..... 2.07642c., Oct. 1	2.06492c., Jan. 8
1934..... 2.15367c., Apr. 24	1.95757c., Jan. 2
1933..... 1.95578c., Oct. 3	1.75836c., May 2
1932..... 1.89196c., July 5	1.83901c., Mar. 1
1931..... 1.99626c., Jan. 13	1.86586c., Dec. 29
1930..... 2.25488c., Jan. 7	1.97319c., Dec. 9
1929..... 2.31773c., May 28	2.26498c., Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 23, 1941, issue.

PIG IRON	
.....	\$24.61 a Gross Ton.....
.....	\$24.61 a Gross Ton.....
.....	\$24.61 a Gross Ton.....
.....	\$23.61 a Gross Ton.....

HIGH	LOW
\$24.61, Feb. 20	\$23.61, Jan. 2
\$23.61	\$23.61
23.61	23.61
23.61	23.61
\$23.61, Mar. 20	\$23.45, Jan. 2
23.45, Dec. 23	22.61, Jan. 2
22.61, Sept. 19	20.61, Sept. 12
23.25, June 21	19.61, July 6
23.25, Mar. 9	20.25, Feb. 16
19.74, Nov. 24	18.73, Aug. 11
18.84, Nov. 5	17.83, May 14
17.90, May 1	16.90, Jan. 27
16.90, Dec. 5	13.56, Jan. 3
14.81, Jan. 5	13.56, Dec. 6
15.90, Jan. 6	14.79, Dec. 15
18.21, Jan. 7	15.90, Dec. 16
18.71, May 14	18.21, Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

SCRAP STEEL	
.....	\$19.17 a Gross Ton.....
.....	\$19.17 a Gross Ton.....
.....	\$19.17 a Gross Ton.....
.....	\$19.17 a Gross Ton.....

HIGH	LOW
\$19.17	\$19.17
19.17	\$15.67, Oct. 24
19.17	19.17
19.17	19.17
\$22.00, Jan. 7	\$19.17, Apr. 10
21.83, Dec. 30	16.04, Apr. 9
22.50, Oct. 3	14.08, May 16
15.00, Nov. 22	11.00, June 7
21.92, Mar. 30	12.67, June 8
17.75, Dec. 21	12.67, June 9
13.42, Dec. 10	10.33, Apr. 29
13.00, Mar. 13	9.50, Sept. 25
12.25, Aug. 8	6.75, Jan. 3
8.50, Jan. 12	6.43, July 5
11.33, Jan. 6	8.50, Dec. 29
15.00, Feb. 18	11.25, Dec. 9
17.58, Jan. 29	14.08, Dec. 3

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

"Put it on the Blanchard"

Get These Advantages

Production ✓

Adaptability

Fixture Saving ✓

Operation Saving

Material Saving

Fine Finish

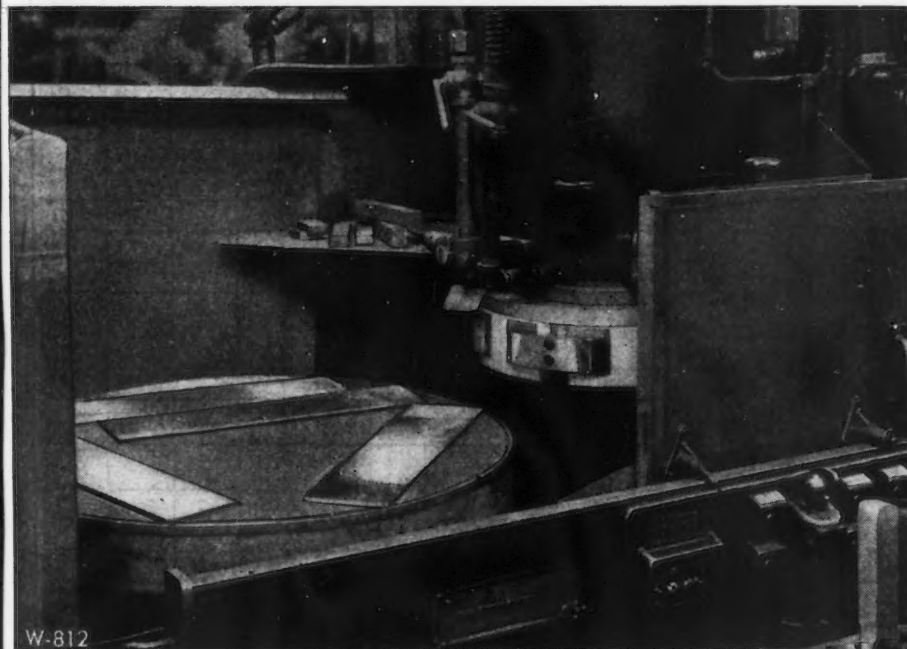
Flatness

Close Limits ✓

.50 cal. Side Plates on No. 18 — 36" Chuck

These alloy steel plates are ground in three operations, first removing .015" stock from each side and then finish grinding the first side, removing .010" stock, to limits of $\pm .00075''$.

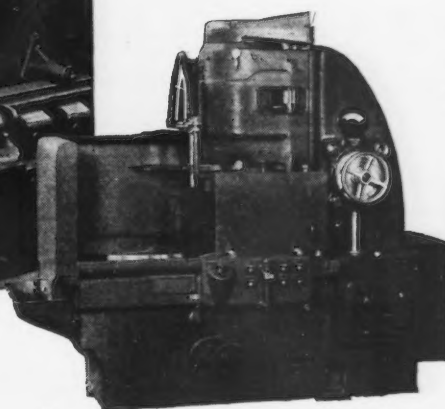
The 36" chuck affords ample area for chucking such rectangular pieces, about 2 feet long. The outer chuck ring is used to retain the pieces on the chuck and their area and thickness are such that no other blocking is needed.



W-812



Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.



This job being done on the No. 18 Blanchard Surface Grinder



The **BLANCHARD** MACHINE COMPANY

64 STATE STREET, CAMBRIDGE 39, MASS., U. S. A.

Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb. unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per 100 lb. under base; primes, 25c. above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire. (15) Deduct 10c. per 100 lb. for plates not produced to sheared mill or universal mill width and length tolerances.

Basing Point Product	DELIVERED TO												
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Care	1st Pacific Ports, Care	Detroit New York Phila- delphia
SHEETS													
Hot rolled	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.30¢	2.20¢		2.75¢	2.30¢ 2.44¢ 2.37¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢ 3.39¢ 3.37¢
Galvanized (24 gage)	3.65¢	3.65¢	3.65¢		3.65¢	3.65¢	3.65¢	3.65¢	3.75¢	3.65¢		4.20¢	3.89¢ 3.82¢
Enameling (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢ 3.71¢ 3.67¢
Long ternes ²	3.80¢	3.80¢	3.80¢									4.55¢	4.16¢ 4.12¢
STRIP													
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢ 2.46¢
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester=3.00¢)				2.90¢ 3.16¢
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢						2.56¢
Commodity C-R	2.95¢	3.05¢		2.95¢			2.95¢		(Worcester=3.35¢)				3.05¢ 3.31¢
TIN PLATE													
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10				5.36¢ 5.32¢
Electro, box													
0.25 lb.	\$4.35	\$4.35	\$4.35										
0.50 lb.	\$4.50	\$4.50	\$4.50						\$4.60				
0.75 lb.	\$4.65		\$4.65						\$4.75				
BLACK PLATE													
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ ¹²	3.37¢
TERNES, MFG.													
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40				
BARS													
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth=2.25¢)	2.50¢	2.80¢	2.25¢	2.49¢ 2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.80¢		
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		2.50¢	2.55¢ ¹³	2.25¢	2.39¢
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		2.50¢	2.55¢ ¹³	2.25¢	2.47¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit=2.70¢) (Toledo=2.80¢)				2.99¢ 2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massillon, Canton=2.70¢)			2.80¢	
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢						3.45¢	
PLATES													
Carbon steel ¹⁴	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢		2.20¢	2.20¢	2.45¢		2.55¢	2.75¢	2.42¢ 2.39¢ 2.25¢
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢	3.71¢ 3.67¢
Alloy	3.50¢	3.50¢				(Coatesville=3.50¢)					3.95¢	4.15¢	3.70¢ 3.59¢
SHAPES													
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem=2.10¢)	2.45¢	2.75¢		2.27¢ 2.21¢
SPRING STEEL, C-R													
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester=3.00¢)				
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester=4.50¢)				
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester=6.35¢)				
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester=8.55¢)				
WIRE													
Bright ¹⁴	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester=2.70¢) (Duluth=2.65¢)		3.10¢		2.92¢
Galvanized													
Spring (High Carbon)	3.20¢	3.20¢		3.20¢					(Worcester=3.30¢)		3.70¢		3.52¢
PILING													
Steel Sheet	2.40¢	2.40¢				2.40¢						2.95¢	2.72¢

EXCEPTIONS TO PRICE SCHED. NO. 6.

Slabs, per gross ton—Andrews Steel Co. \$41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. \$41; Phoenix Iron Co. (rerolling) \$41; (forging) \$47; Granite City Steel \$47.50; Kaiser Co. (rerolling) \$58.64, (forging) \$64.64, f.o.b. Los Angeles.

Blooms, per gross ton—Phoenix Iron Co. (rerolling) \$41; (forging) \$47; Pgh. Steel Co. (rerolling) \$38.25, (forging) \$44.25; Wheeling

Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) \$58.64, (forging) \$64.64, (shell steel) \$74.64 f.o.b. Los Angeles.

Sheet Bar, per gross ton—Empire Sheet & Tin Plate Co. \$39 mill; Wheeling Steel Corp. \$38 Portsmouth, Ohio.

Billets, Forging, per gross ton—Andrews Steel Co. \$50 basing pts.; Follansbee Steel Corp. \$49.50 Toronto, Ohio; Phoenix Iron Co. \$47 mill; Geneva Steel Co. \$64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. \$49.50; Kaiser

Co. \$64.64, (shell steel) \$74.64, f.o.b. Los Angeles.

Billets, Rerolling, per gross ton—Continental Steel Corp. may charge Acme Steel in Chicago switching area \$34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) \$41 mill; Wheeling Steel Corp. 4 in. sq. or larger \$37.75, smaller \$39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at \$39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. \$41 mill; Contin-

PRICES

Steel Corp. (1½ x 1½) \$39.50, (2 x 2) \$45.00 Kokomo, Ind. (these prices include \$1 extra); Keystone Steel & Wire Co. \$40.00 Peoria; Connors Steel Co. \$50.60 Birmingham; Ford Motor Co. \$34 Dearborn, Mich.; Geneva Steel Co. \$58.64 f.o.b. Pacific Coast; Pgh. Steel Co. \$43.50; Kaiser Co. \$64 f.o.b. Los Angeles.

Structural Shapes—Phoenix Iron Co. 2.35c. basing pts. (export) 2.50c. Phoenixville; Knoxville Iron Co. 2.30c. basing points; Kaiser Co. 3.20c. f.o.b. Los Angeles.

Bars, per gross ton—Sweet Steel Co. (rail steel) \$50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp., \$45 cello.

Hot Rolled Plate—Granite City Steel Co. 2.5c. mill; Knoxville Iron Co. 2.25c. basing pts.; Kaiser Co. and Geneva Steel Co. 3.20c. Pacific Ports; Central Iron and Steel Co. 2.5c. basing points; Granite City Steel Co. 2.5c. Granite City.

Merchant Bars—W. Ames Co., 10 tons and over, 2.35c. mill; Eckels-Nye Steel Corp. 2.50c. basing pts. (rail steel) 2.40c.; Phoenix Iron Co. 2.40c. basing pts.; Sweet Steel Co. (rail steel) 2.33c. mill; Joslyn Mfg. & Supply Co., 2.5c. Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar), 2.35c. Chicago; Knoxville Iron Co., 2.30c. basing pts.; Lacoste Steel Co., sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill.; Milton Mfg. Co., 2.75c. f.o.b. Milton, Pa.

Steel Skelp—Wheeling Steel Corp., Benwood, 2.5c.

Reinforcing Bars—W. Ames & Co., 10 tons and over, 2.35c. mill; Sweet Steel Co. (rail steel), 2.33c. mill; Columbia Steel Co., 2.50c. Pacific Ports.

Old Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus freight on hot rolled bars Pittsburgh to Spring City, Pa.; New Engand Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants, f.o.b. plant; Compressed Steel Shaffing Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass., f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

May Bars—Texas Steel Co., for delivery except Texas and Okla., Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co., shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co., 2.5c. Chicago; Knoxville Iron Co., 2.25c. basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middle-town base on shipments to Detroit or area; Parkersburg Iron & Steel Co., 2.25c. Parkersburg.

Galvanized Sheets—Andrews Steel Co. 3.75c. basing pts.; Parkersburg Iron & Steel Co., 2.5c. Parkersburg; Apollo Steel Co., 3.75c. basing pts.; Continental Steel Co., Middle-town base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Second-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., minimum base price mill is 2.45c. per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

Wire Products—Pittsburgh Steel Co., f.o.b. Pittsburgh, per 100 lb., rods, No. 5 to 9/32, 2.20c.; rods, heavier than 9/32, 2.35c.; bright wire, 2.725c.; bright nails, 2.90c.; lead and furnace annealed wire, 2.85c.; pot annealed wire, 2.85c.; galvanized barbed wire, 3.0c.; plain staples, 2.55c.; galvanized staples, 2.6c.; bright spring wire, 3.30c.; galvanized spring wire, 3.45c.



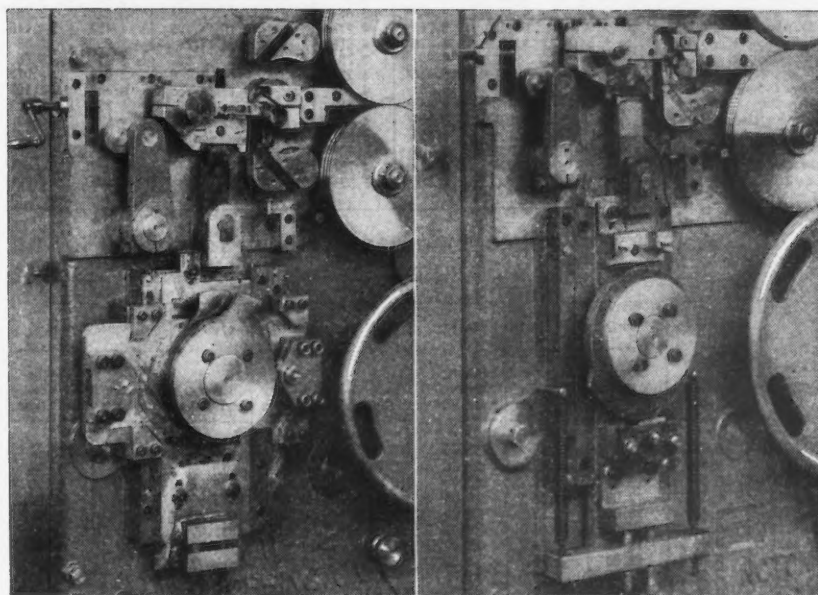
TORRINGTON

Force Feed Mechanical
LUBRICATOR

Positive, never-failing force-feed bearing lubrication. Design flexibility also enables power takeoff from machine to front, rear, side or bottom by ratchet or rotary means. For complete information write, stating number of feeds and drive desired.

THE TORRINGTON

MANUFACTURING CO., TORRINGTON, CONN.



HELPS TO GREATER ACCURACY in Spring Coiling

No. 14 Torsion Attachment

Two types of torsion attachments are shown, either of which may be applied to any Torrington Spring Coiler. One type has positive engaging means and spring return; the other positive action in both directions. The latter is the more accurate of the two on wire diameters of 1/8" and larger. It is also easier to set up.

The attachment can produce at high speeds springs having one extended end and which are cut on center at the other end. Barrel, taper, or two-diameter torsion springs are also easily coiled. The number and size of coiled sections and straight lengths which may be produced as a single unit is practically unlimited, within the wire feed capacity of the coiler. This device coils with ease springs with closed end coils with extended ends located at right angles to the axis of the spring body. The extensions may have any desired relative angularity.

Production speed and length of first end depend upon the rigidity of the spring. The coiled spring and the last end may be any desired portions of the remaining wire feed capacity. The torsion attachment is an important adjunct to the equipment of any modern spring manufacturer.

May 17 — Maintenance of Accuracy in Torsion Coiling



THE TORRINGTON

MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

PRICES

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	\$3.618	\$4.872 ^a	\$5.168 ^a	\$3.922	\$4.772	\$3.705	\$3.666	\$3.822	\$4.072	\$5.966	\$7.066	\$7.272	\$8.322
New York	3.690	4.613 ^a	5.160	3.974 ^a	4.772	3.868	3.758	3.853	4.103	5.858	6.908	7.103	8.203
Boston	3.844	4.744 ^a	5.374 ^a	4.106	4.778	4.012	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.494	4.852	5.044	3.902	4.752	3.694	3.759	3.802	4.082				
Newark	3.871	4.965	5.521	4.185	4.885	4.071	4.002	4.085	4.185				
Chicago	3.35	4.20	5.381	3.60	4.651 ^a	3.65	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.487	4.337 ^a	5.422 ^a	3.737	4.787 ^a	3.787	3.687	3.637	3.887	5.987	7.087	7.087	8.137
Cleveland	3.45	4.40	5.027 ^a	3.60	4.45	3.50	3.588	3.35	3.75	5.958	7.058	6.85	7.90
Buffalo	3.45	4.40	4.904 ^a	3.619	4.669	3.73	3.40	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.55	4.50	5.154 ^a	3.70	4.659 ^a	3.709	3.661	3.45	3.80	6.08	7.18	7.159	8.209
Cincinnati	3.525	4.475 ^a	4.975 ^a	3.675	4.711	3.711	3.691	3.611	4.011				
St. Louis	3.497	4.347 ^a	5.322 ^a	3.747	4.831 ^a	3.797	3.697	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.45	4.40	4.90	3.60	4.45	3.50	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.61	4.48	5.407 ^a	3.88	4.351 ^a	3.913	3.813	3.763	4.361	6.09	7.19	7.561	8.711
Omaha	3.965	5.443	5.758 ^a	4.215		4.265	4.165	4.115	4.43				
Indianapolis	3.68	3.58	4.718	4.918	3.768	4.88	3.63	3.58	3.96	8.08	7.18	7.18	8.23
Birmingham	3.55		4.90	3.70		3.65	3.55	3.50	4.43				
Memphis	4.065 ^a	4.86	3.415	4.215		4.165	4.065	4.015	4.33				
New Orleans	4.158 ^a	4.95	5.508	4.308		4.258	4.158 ^a	4.108 ^a	4.629				
Houston	3.683	5.873	6.483 ^a	4.313		4.35	4.25	3.75	6.373 ^a	7.223	8.323	8.323	9.373
Los Angeles	5.10	7.20 ^a	6.254 ^a	4.95	5.613 ^a	5.05	4.65	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.651 ^a	7.304 ^a	6.504 ^a	4.804 ^a	7.333 ^a	4.754	4.354	4.154 ^a	5.333	8.304	9.404	9.404	10.454
Seattle	4.751 ^a	7.054 ^a	6.104 ^a	4.251 ^a		4.651 ^a	4.451 ^a	4.351 ^a	5.753	8.404	9.404		
Portland	4.751 ^a	6.804 ^a	5.504 ^a	4.751 ^a		4.651 ^a	4.451 ^a	4.351 ^a	5.533	8.304	9.404	9.404	
Salt Lake City	4.631 ^a		6.321 ^a	5.531 ^a		5.081 ^a	4.981 ^a	4.881 ^a	5.90				

National Emergency Steels MILL EXTRAS

Designa- tion	Basic Open-Hearth		Electric Furnace		Designa- tion	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 8612	0.65 ^a	\$13.00	\$1.15	\$23.00	NE 9427	0.75 ^a	\$15.00	\$1.25	\$25.00
NE 8615	0.65	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00
NE 8617	0.65	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8620	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8622	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8625	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8627	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8630	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8632	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8635	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8637	0.65	13.00	1.15	23.00					
NE 8640	0.65	13.00	1.15	23.00	NE 9722	0.65	13.00	1.15	23.00
NE 8642	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8645	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8647	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
NE 8650	0.65	13.00	1.15	23.00	NE 9742	0.65	13.00	1.15	23.00
					NE 9745	0.65	13.00	1.15	23.00
NE 8712	0.70	14.00	1.20	24.00	NE 9747	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9750	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00	NE 9753	0.65	13.00	1.15	23.00
NE 8720	0.70	14.00	1.20	24.00	NE 9758	0.65	13.00	1.15	23.00
NE 8722	0.70	14.00	1.20	24.00					
NE 8725	0.70	14.00	1.20	24.00	NE 9830	\$1.30	26.00	1.80	36.00
NE 8727	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9835	1.30	26.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 8747	0.70	14.00	1.20	24.00					
NE 8750	0.70	14.00	1.20	24.00					
NE 9415	0.75	15.00	1.25	25.00	NE 9912	1.20	24.00	1.55	31.00
NE 9417	0.75	15.00	1.25	25.00	NE 9915	1.20	24.00	1.55	31.00
NE 9420	0.75	15.00	1.25	25.00	NE 9917	1.20	24.00	1.55	31.00
NE 9422	0.75	15.00	1.25	25.00	NE 9920	1.20	24.00	1.55	31.00
NE 9425	0.75	15.00	1.25	25.00	NE 9922	1.20	24.00	1.55	31.00
					NE 9925	1.20	24.00	1.55	31.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, AISI Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and \$5 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of \$2.70 for 100 lb. on finished products and \$54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(*) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

Add 0.271c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)

Per Gross Ton
Old range, bessemer, 51.50 \$4.75
Old range, non-bessemer, 51.50 4.40
Mesaba, bessemer, 51.50 4.40
Mesaba, non-bessemer, 51.50 4.45
High phosphorus, 51.50 4.35
*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

FLUORSPAR

Maximum price f.o.b. consumer's plant \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluor spar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF₂ Content: Base price per short ton
70% or more \$33.00
65% but less than 70% 32.00
60% but less than 65% 31.00
Less than 60% 30.00

PRICES

SEMI-FINISHED STEEL

Ingots, Carbon, Re-rolling

Base per gross ton, f.o.b. mill.... \$31.00
 Exceptions: Phoenix Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., \$34.25; Pgh. Steel Co., \$33.10.

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown... \$36.00
 Exceptions: Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., \$38.10.

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh... \$45.00
 Exceptions: C/L delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (re-rolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$12 higher. Provo, \$11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

Per Gross Ton
 Re-rolling \$34.00
 Forging quality 40.00
 For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem, per gross ton \$54.00
 Price delivered Detroit \$2.00 higher; East Michigan, \$3.00 higher.

Shell Steel

Per Gross Ton
 3 in. to 12 in. \$52.00
 12 in. to 18 in. 54.00
 18 in. and over 56.00
 Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.
 Prices delivered Detroit are \$2.00 higher; East Michigan, \$3 higher.
 Price Exceptions: Follansbee Steel Corp. permitted to sell at \$13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of \$52.00.
 Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.
 Per Gross Ton
 Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.
 Per Lb.
 Grooved, universal and sheared .. 1.90c.

Wire Rods

(No. 5 to 9/32 in.)
 Per Lb.
 Pittsburgh, Chicago, Cleveland ... 2.00c.
 Worcester, Mass. 2.10c.
 Birmingham 2.00c.
 San Francisco 2.50c.
 Galveston 2.25c.
 9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)
 Base per lb.
 High speed 67c.
 Straight molybdenum 54c.
 Tungsten-molybdenum 57 1/2c.
 High-carbon-chromium 43c.
 Oil hardening 24c.
 Special carbon 22c.
 Extra carbon 18c.
 Regular carbon 14c.
 Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 2c. higher.

PERFORATED METALS

INDUSTRIAL and ORNAMENTAL

To produce the highest quality of perforated metal as used in the industrial arts and for ornamentation has been the ambition and persistent endeavor of this company. The highest quality best serves the user. We are here to serve you.

ANY METAL • ANY PERFORATION

The
Harrington & King
 PERFORATING CO.

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 Eastern Office, 114 Liberty Street, New York 6, N. Y.



HEAT-TREATED STEEL SHOT

We manufacture
 shot and grit for
 endurance

A shot or grit that will blast fast with a clean finish.

Heat-Treated Steel Shot and Heat-Treated Steel Grit

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

The unprecedented demand for our—

**HARRISON
 ABRASIVE
 CORPORATION**

Manchester, New Hampshire

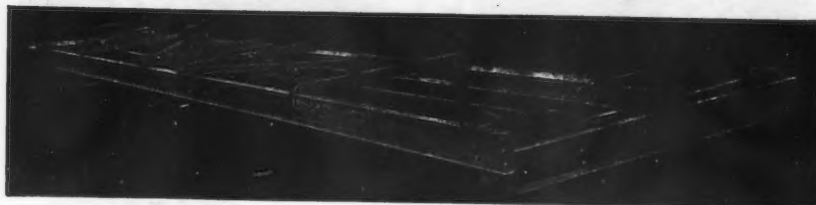


HEAT-TREATED STEEL GRIT

CONCO

3-Motor Single Girder
CAB OR FLOOR
OPERATED

ELECTRIC CRANE . . .



● Available in capacities of one through five tons for floor or cab operation. Simply, ruggedly designed for low first cost and maintenance. Used with Low Headroom Type Hoist, provides for maximum space coverage horizontally and vertically. Effective in even a minimum space. Write for Bulletin 2000.



Write for Bulletin 26000 describing the Torpedo Hoist shown. Three capacities 250 lb. — \$139.50, 500 lb. — \$149.50, 1000 lb. — \$159.50. Heavily, simply built, with Push Button Control. Outstanding in CONCO'S complete line of hand-powered and electric Cranes, Hoists, Trolleys.

CONCO ENGINEERING WORKS
Div. of H. D. Conkey & Co. — 15 Grove St. — Mendota, Ill.
Builders Of Conco Torpedo Electric Hoist

ERIE BUCKETS



THE COMPLETE LINE

General Purpose
Dredging and Hard Digging
Dragline
Material Handlers
Hook-on Type
Ore Handling
Coal and Coke
4-Rope
Barge Type
Strayer Electric

Write for Data

Above types built in weights and capacities to suit your crane and job requirements.

ERIE STEEL CONSTRUCTION CO.

ERIE, PENNSYLVANIA

Aggre Motors • Buckets • Concrete Plants • Traveling Cranes

PRICES

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—\$200.00 per Net Ton

Steel (Butt Weld)

	Black	Galv.
1/2 in.	63 1/2	61
3/4 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

Wrought Iron (Butt Weld)

1/2 in.	24	3 1/2
3/4 in.	30	10
1 and 1 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

Steel (Lap Weld)

2 in.	61	49 1/2
2 1/2 in. and 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2

Wrought Iron (Lap Weld)

2 in.	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17

Steel (Butt, extra strong, plain ends)

1/2 in.	61 1/2	50 1/2
3/4 in.	65 1/2	54 1/2
1 to 3 in.	67	57

Wrought Iron (Same as Above)

1/2 in.	25	6
3/4 in.	31	12
1 to 2 in.	38	19 1/2

Steel (Lap, extra strong, plain ends)

2 in.	59	48 1/2
2 1/2 and 3 in.	63	52 1/2
3 1/2 to 6 in.	66 1/2	56

Wrought Iron (Same as Above)

2 in.	33 1/2	15 1/2
2 1/2 to 4 in.	39	22 1/2
4 1/2 to 6 in.	37 1/2	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago. . . .	\$54.80
6-in. and larger, del'd New York. . .	52.20
6 in. and larger, Birmingham. . . .	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles.	69.40
6-in. and larger f.o.b. cars, Seattle. .	71.20
Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.	

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless	Lap Weld
	Gold	Hot
	Drawn	Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04
2 1/2 in. o.d. 12 B.W.G.	20.21	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50
3 1/2 in. o.d. 11 B.W.G.	28.37	24.62
4 in. o.d. 10 B.W.G.	35.20	30.54
(Extras for less carload quantities)		
40,000 lb. or ft. and over.	Base	
30,000 lb. or ft. to 39,999 lb. or ft. .	5%	
20,000 lb. or ft. to 29,999 lb. or ft. .	10%	
10,000 lb. or ft. to 9,999 lb. or ft. . .	20%	
5,000 lb. or ft. to 4,999 lb. or ft. . .	30%	
2,000 lb. or ft. to 1,999 lb. or ft. . .	45%	
Under 2,000 lb. or ft.	65%	

PRICES

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	Base per Keg	
Standard wire nails....	\$2.80	\$3.30
Coated nails	2.80	3.30
Cut nails, carloads	3.85
	Base per 100 lb.	
Annealed fence wire...	\$3.05	\$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence*67	.35
Fence posts, carloads...	.69	.36
Single loop bale ties....	.59	.34
Galvanized barbed wire**	.70	.30
Twisted barbless wire..	.70

*15% gage and heavier. **On 80-rd spools in carload quantities.

†Prices subject to switching or transportation charges.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

	Base discount less case lots	Per Cent Off List
1/4 in. & smaller x 6 in. & shorter...	65 1/2	
3/16 & 1/2 in. x 6 in. & shorter....	63 1/2	
3/4 to 1 in. x 6 in. shorter.....	61	
1 1/4 in. and larger, all lengths.....	59	
All diameters over 6 in. long.....	59	
Leg. all sizes	62	
Plow bolts	65	

Nuts, Cold Punched or Hot Pressed: (Hexagon or Square)

	U.S.S.	S.A.E.
1/4 in. and smaller	62	
3/16 to 1 in. inclusive	59	
1 1/4 to 1 1/2 in. inclusive	57	
1 1/2 in. and larger	56	
On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.		

Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

	Base discount less keg lots	
7/16 in. and smaller.....	64	
1/2 in. and smaller	62	
3/4 in. through 1 in.	60	
5/16 in. through 1 in.	59	
1 1/4 in. through 1 1/2 in.	57	58
1 1/2 in. and larger	56	
In full keg lots, 10 per cent additional discount.		

Stove Bolts

	Consumer
Packages, nuts loose	71 and 10
In packages, with nuts attached....	71
In bulk	80
On stove bolts freight allowed up to 35c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.	

Large Rivets

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75

Small Rivets

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws Consumer

	Per Cent Off List
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes....	36
Fillister head cap, listed sizes.....	51
Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.	

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
3-lb. coating I.C....	\$5.00	\$12.00
15-lb. coating I.C....	7.00	14.00
20-lb. coating I.C....	7.50	15.00



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ENDLESS
JOURNEY

ROLL ON ABBOTT Bearing BALLS

Heavy duty applications, light assemblies, intricate mechanisms — all carry the load as planned with ABBOTT BEARING BALLS on the job. They have the stamina, uniformity and precision to stand the gaff of gruelling service . . . For uninterrupted performance start ABBOTT BEARING BALLS on their endless journey in your bearing races.

UNINTERRUPTED PERFORMANCE

Specify "ABBOTT" and be sure



ROLL ON
ABBOTT Bearing BALLS
THE ABBOTT BALL COMPANY HARTFORD 10, CONN. U.S.A.



BULLETIN 22-B-12 points the way

It explains the advantages that are possible thru the ability of "R-C" Rotary Positive Blowers to build up pressures to overcome the maximum resistance encountered in your cupolas, as well as the ability to deliver, economically, the correct volume of air to meet any condition. Your request will bring a copy of this Bulletin by return mail.



ROOTS-CONNERSVILLE BLOWER CORP.

One of the Dresser Industries

504 Ohio Avenue

Connorsville, Indiana



Rotary Positive
CUPOLA BLOWERS

PRICES

PIG IRON

PIG IRON

BASING POINT* BASE PRICES						DELIVERED PRICES† (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	\$25.50	\$26.00	\$26.50	\$27.00		Boston	Everett	\$.50	\$26.00	\$26.50	\$27.00	\$27.50	
Birdsboro	25.50	26.00	26.50	27.00	\$30.50	Birdsboro-Steelton	4.02						\$34.52
Birmingham	20.00	21.38		26.00		Bethlehem	2.50	28.00	28.50	29.00	29.50		
Buffalo	24.00	25.00	25.50	26.00	30.50	Brooklyn	2.92						33.42
Chicago	24.50	25.00	25.00	25.50		Brooklyn	Birdsboro	1.39	25.89	26.39	26.39	26.89	
Cleveland	24.50	25.00	25.00	25.50		Canton	Cleveland	3.19					33.69
Detroit	24.50	25.00	25.00	25.50		Canton	Buffalo	4.06	24.06	25.44			
Duluth	25.00	25.50	25.50	26.00		Cincinnati	Birmingham	1.11			26.11		
Erie	24.50	25.00	25.50	26.00		Cincinnati	Buffalo	4.40					34.90
Everett	25.50	26.00	26.50	27.00		Cincinnati	Hamilton	1.53	27.03	27.53	28.03	28.53	
Granite City	24.50	25.00	25.00	25.50		Jersey City	Bethlehem	1.94					32.44
Hamilton	24.50	25.00	25.00			Jersey City	Birdsboro	4.95	27.45	27.95			45.91
Neville Island	24.50	25.00	25.00	25.50		Los Angeles	Buffalo	15.41					
Provo	22.50	23.00				Los Angeles	Cleveland & Toledo	1.94	26.44	26.94	26.94	27.44	
Sharpsville	24.50	25.00	25.00	25.50		Mansfield	Buffalo	3.36					33.86
Sparrows Point	25.50	26.00				Philadelphia	Swedeland	.84	26.34	26.84	27.34	27.84	
Steelton	25.50				30.50	Philadelphia	Birdsboro	1.24					31.74
Swedeland	25.50	26.00	26.50	27.00		San Francisco	Provo	4.95	27.45	27.95			45.91
Toledo	24.50	25.00	25.00	25.50		San Francisco	Buffalo	15.41					45.91
Youngstown	24.50	25.00	25.00	25.50		Seattle	Provo	4.95	27.45	27.95			
						Seattle	Buffalo	15.41					45.91
						St. Louis	Granite City	.50	25.00	25.50	25.50	26.00	
						St. Louis	Buffalo	7.07					37.57

* Maximum per gross ton, established by OPA February 14, 1945.

† Prices do not reflect 3 per cent tax on freight.

* Maximum per gross ton, established by OPA February 14, 1945.

† Prices do not reflect 3 per cent tax on freight.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, \$33.00 and \$34.00, respectively. Delivered to Chicago, \$37.34. High phosphorus iron sells at Lyles, Tenn., at \$28.50.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25

per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

If it's a small part turn it with Precision, Speed and Profit on a

SHELDON LATHE



MODEL S-56 10" PRECISION LATHE

Engineered for precision shop and tool room work. Rigidly built to stand up and hold its close accuracy under round-the-clock operation. This is a quality machine tool in every detail, yet is moderate in price . . . a lathe that stands out far ahead of others. (The lathe selected by U. S. Army, the Navy and the Marine Corps, for mechanized machine shops, instrument repair shops, etc.)

Contact us or your local Sheldon dealer for prices, engineering data, deliveries, etc.

Sheldon Machine Co., Inc., 4210 N. Knox Ave., Chicago 41, U.S.A.

All SHELDON lead screws are cut on the finest Pratt and Whitney "Super-Precision" lead screw machine.

BUILDERS of GOOD LATHES since 1919.

- Heavy Bronze bearings
- 11" Collet capacity
- 11 1/2" swing
- Double-walled apron
- Large hardened and ground spindle
- Extreme accuracy
- Convenient controls
- Underneath V-belt motor drive.
- All Steel Bench

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh	21 1/2 to 23 1/2 c.
Copper, reduced, 150 and 200 mesh	20 1/2 to 25 1/2 c.
Iron, commercial, 100 and 200 mesh 96 + % Fe	12 1/2 to 15 c.
Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots	4 c.
Iron, hydrogen reduced, 300 mesh and finer, 98 1/2 + % Fe, drum lots	63 c.
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe 30 to 33 c.	
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42 c.
Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90 c.
Aluminum, 100 and 200 mesh	*23 to 27 c.
Antimony, 100 mesh	20.6 c.
Cadmium, 100 mesh	\$1
Chromium, 150 mesh	\$1.03
Lead, 100, 200 & 300 mesh	11 1/2 to 12 1/2 c.
Manganese, 150 mesh	51 c.
Nickel, 150 mesh	51 1/2 c.
Solder powder, 100 mesh 8 1/2 c. plus metal	
Tin, 100 mesh	58 1/2 c.
Tungsten metal powder, 98%-99%, any quantity, per lb.	\$2.60
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	\$2.60
Under 100 lb.	\$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$7.00*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.25
Foundry, By-Product	
Chicago, del'd	13.35
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.88
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Painesville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.85
Birmingham, del'd	10.50

*Hand drawn ovens using trucked coal permitted to charge \$7.75 per ton plus transportation charges.

PRICES

REFRACTORIES (F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	\$66.55
First quality, Pa., Md., Ky., Mo., Ill.	52.85
First quality, New Jersey	57.70
Sec. quality, Pa., Md., Ky., Mo., Ill.	47.95
Sec. quality, New Jersey	52.55
No. 1 Ohio	44.30
Ground fire clay, net ton	7.80

Silica Brick

Pennsylvania and Birmingham	\$52.85
Chicago District	60.65
Silica cement, net ton (Eastern)	9.25

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt.	
Plymouth Meeting, Chester	\$54.00

Magnesite Brick

Standard, Balt. and Chester	\$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester	
in sacks (carloads)	\$43.48
Domestic, f.o.b. Chewelah, Wash.	
(in bulk)	22.00

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb.	
No. 1 O.H., gross ton	\$43.00
Angle splice bars, 100 lb.	2.70
(F.o.b. Basing Points)	Per Gross Ton
Light rails (from billets)	\$43.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plate, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to rail-roads	5.00c.
Track bolts, jobbers discount	63-5
Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steeleton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.	

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	22.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	25.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

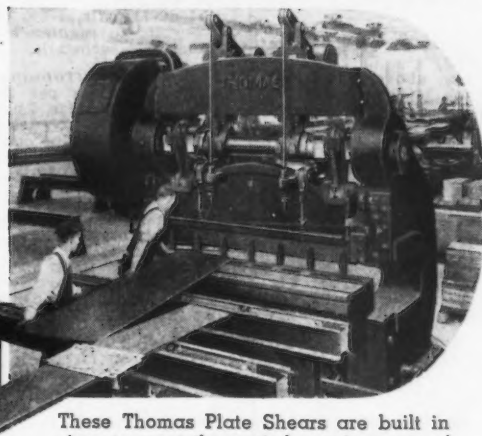
ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.
F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.	

SPECIAL MACHINERY BUILT ON CONTRACT

THOMAS Plate Shears



These Thomas Plate Shears are built in sizes to meet the varied requirements of Industry. Capacities up to 3" in thicknesses, widths to 14 feet or more. Thomas Shears are rugged and dependable, requiring but a minimum of maintenance.

Write for Bulletin 126.

THOMAS

MACHINE MANUFACTURING COMPANY

PITTSBURGH, PA.

New Open Hearth Furnaces
at 8 LARGE PLANTS

are Insulated with
Therm-O-flake

SPECIFICATIONS

for Greater Fuel Economy
Improved Working Conditions

Therm-O-flake Coating Vertical walls — bulkheads — roofs — arches.

Therm-O-flake Brick Flue Walls and Arch — Checker Chamber Walls. Slag Pocket Walls.

Therm-O-flake Concrete Flue — Checker Chamber Hearth Bottoms.



High Temperature

INSULATION

JOLIET, ILL.

FERROALLOY PRICES

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale Rockwood, Tenn.
 Carload lots (bulk)\$135.00
 Carload lots (packed) 141.00
 Less ton lots (packed) 148.50
 \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.
 96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.
 Carload, bulk 36c.
 L.c.l. lots 38c.
 95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.
 Carload, bulk 34c.
 L.c.l. lots 35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.
 16-19% Mn 19-21% Mn
 3% max. Si 3% max. Si
 Carloads \$35.00 \$36.00
 Less ton 47.50 48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.
 Eastern Zone Central Western
 50% Si ... 6.65c. 7.10c. 7.25c.
 75% Si ... 8.05c. 8.20c. 8.75c.
 80-90% Si ... 8.90c. 9.05c. 9.55c.
 90-95% Si ... 11.05c. 11.20c. 11.65c.
 Spot sales add: 45c. per lb. for 50% Si, .3c. per lb. for 75% Si, .25c. per lb. for 80-90% and 90-95% Si.

Silvery Iron

(C/L, Per Gross Ton, base 6.00 to 6.50 Si)
 F.o.b. Jackson, Ohio\$30.50
 Buffalo 31.75
 For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

Bessemer Ferrosilicon

Prices are \$1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe..	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe..	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk.	3.35c.	3.50c.	3.65c.
2000 lb.-carload	3.8c.	4.2c.	4.25c.

Silicomanganese

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.
 Carload, bulk 6.05c.
 2000 lb. to carload 6.70c.
 Under 2000 lb. 6.90c.
 Briquets, contract, basis carlots, bulk freight allowed, per lb. ... 5.80c.
 2000 lb. to carload 6.30c.
 Less ton lots 6.55c.

Ferrochrome

(65-72% Cr, 2% max. Si)

OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C	23.00c.	23.40c.	24.00c.
0.10% C	22.50c.	22.90c.	23.50c.
0.15% C	22.00c.	22.40c.	23.00c.
0.20% C	21.50c.	21.90c.	22.50c.
0.50% C	21.00c.	21.40c.	22.00c.
1.00% C	20.50c.	20.90c.	21.50c.
2.00% C	19.50c.	19.90c.	21.00c.
66-71% Cr,			
4-10%	13.00c.	13.40c.	14.00c.
62.66% Cr,			
5-7% C	13.50c.	13.90c.	14.50c.

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

	Carloads, Bulk	Ton Lots	Less Ton
0.10% max. C, 1 or 2% max. Si	23.00c.	23.40c.	23.65c.
0.15% max. C, 1 or 2% max. Si	22.00c.	22.40c.	22.65c.
0.30% max. C, 1 or 2% max. Si	21.00c.	21.40c.	21.65c.
0.50% max. C, 1 or 2% max. Si	20.00c.	20.40c.	20.65c.
0.75% max. C, 7.00% max. Si	16.00c.	16.40c.	16.65c.

Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk..	3.35c.	3.55c.	3.95c.
Ton lots	3.75c.	3.25c.	10.75c.
Less ton lots ..	9.00c.	9.50c.	11.00c.

Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk..	6.05c.	6.30c.	6.60c.
Ton lots	6.65c.	7.55c.	8.55c.
Less ton lots ..	6.30c.	7.80c.	8.80c.

Calcium-Manganese-Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

	Eastern Zone	Central Zone	Western Zone
Carloads	15.50c.	16.00c.	18.05c.
Ton lots	16.50c.	17.35c.	19.10c.
Less ton lots ..	17.00c.	17.35c.	19.60c.

Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

	Ten lots	Cast	Turnings Distilled
Less ton lots..	2.30	2.80	5.75

Chromium-Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 83-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Ton lots	1.20	1.2075	1.229
Less ton lots ..	1.30	1.3075	1.329

Manganese-Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales. 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	1.89	1.903	1.935
Less ton lots ..	2.01	2.023	2.055

Nickel-Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern Zone	Central Zone	Western Zone
11,200 lb. or more ..	\$1.90	\$1.9125	\$1.9445
Ton lots ...	2.00	2.09125	2.0445
Less ton lots	3.10	2.1125	2.1445

Other Ferroalloys

Ferrotungsten, Standard grade, lump or 1/2X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more.... \$1.90

Ferrovandium, 85-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.

Open hearth	\$2.70
Crucible	\$2.80
Primos	\$2.90

Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal \$1.50

Vanadium pentoxide, 88-92% V₂O₅ technical grade, contract basis, any quantity, per lb. contained V₂O₅. Spot sales add 5c. per lb. contained V₂O₅ \$1.10

Silicaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)

Carload lots	25c.
2000 lb. to carload	26c.

Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)

Carload lots	58c.
2000 lb. to carload	59c.

Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis

No. 1	87.5c.
No. 6	60c.
No. 79	45c.

Bortram, f.o.b. Niagara Falls
 Ton lots, per lb. 45c.
 Less ton lots, per lb. 50c.

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.
 2000 lb. lots \$2.25
 Under 2000 lb. lots \$2.30

Ferrotitanium, 40-45%, 9.10% C max, f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti... \$1.23
 Less ton lots \$1.25

Ferrotitanium, 20-25%, 9.10% C max., ton lots, per lb. contained titanium \$1.35
 Less ton lots \$1.40

High-carbon ferrotitanium, 15%-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload.... \$142.50

Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalled with Rockdale, Tenn., per gross ton \$58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton \$75.00

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo. 95c.

Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo. 80c.

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo. 80c.

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo. 80c.

Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 3/4c. for spot sales

Carload lots	14c.
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Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy
 Carload, bulk 4.6c.

Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk 5.75c.
 Ton lots 7.25c.

Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.

Car lots	8.00c.
Ton lots	8.75c.
Less ton lots	9.25c.